1010494	A

REVISIONS			
SYM	DESCRIPTION	DATE	APPD.
A	REPLACED BY REV B WITH CHANGES PER TDRR 02615	8/14/63	WK

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.

UNITS SHALL MEET ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002055 UNLESS MODIFIED OR AMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING.

EACH POLE OF THE SWITCH ASSEMBLY SHALL CONSIST OF ONE BASIC SWITCH PER 1010435-001.

INSPECTION & ACCEPTANCE:

MECHANICAL REQUIREMENTS:

MATERIALS AND FINISH:

EXPOSED METAL PARTS: CORROSION RESISTANT STEEL, PASSIVATED.

DETENT WHEEL: DELRIN

SEALING: BASIC SWITCHES SHALL BE BACKFILLED WITH AN INERT GAS AND HERMETICALLY SEALED.

DIMENSIONS SHALL BE AS SHOWN.

INDEX: 45° ± 5°, WITH POSITIVE DETENT POSITIONING ACTION.

ROTATION: NON-ADJUSTABLE STOPS SHALL BE POSITIONED SUCH THAT MECHANICAL ROTATION OF THE SWITCH IS LIMITED TO NUMBER OF POSITIONS SPECIFIED PER TABLE WITHOUT OBJECTIONABLE OVERTRAVEL.

ROTATION TORQUE: SHALL BE 2 TO 6 IN.-LB.

SWITCHES ACTUATED IN ANY POSITION DO NOT NECESSARILY OPERATE SIMULTANEOUSLY.

MARKING: ASSEMBLIES SHALL BE PIECEMARKED IN ACCORDANCE WITH MIL-STD-130. TERMINAL IDENTIFICATION SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PARTS.

ELECTRICAL REQUIREMENTS:

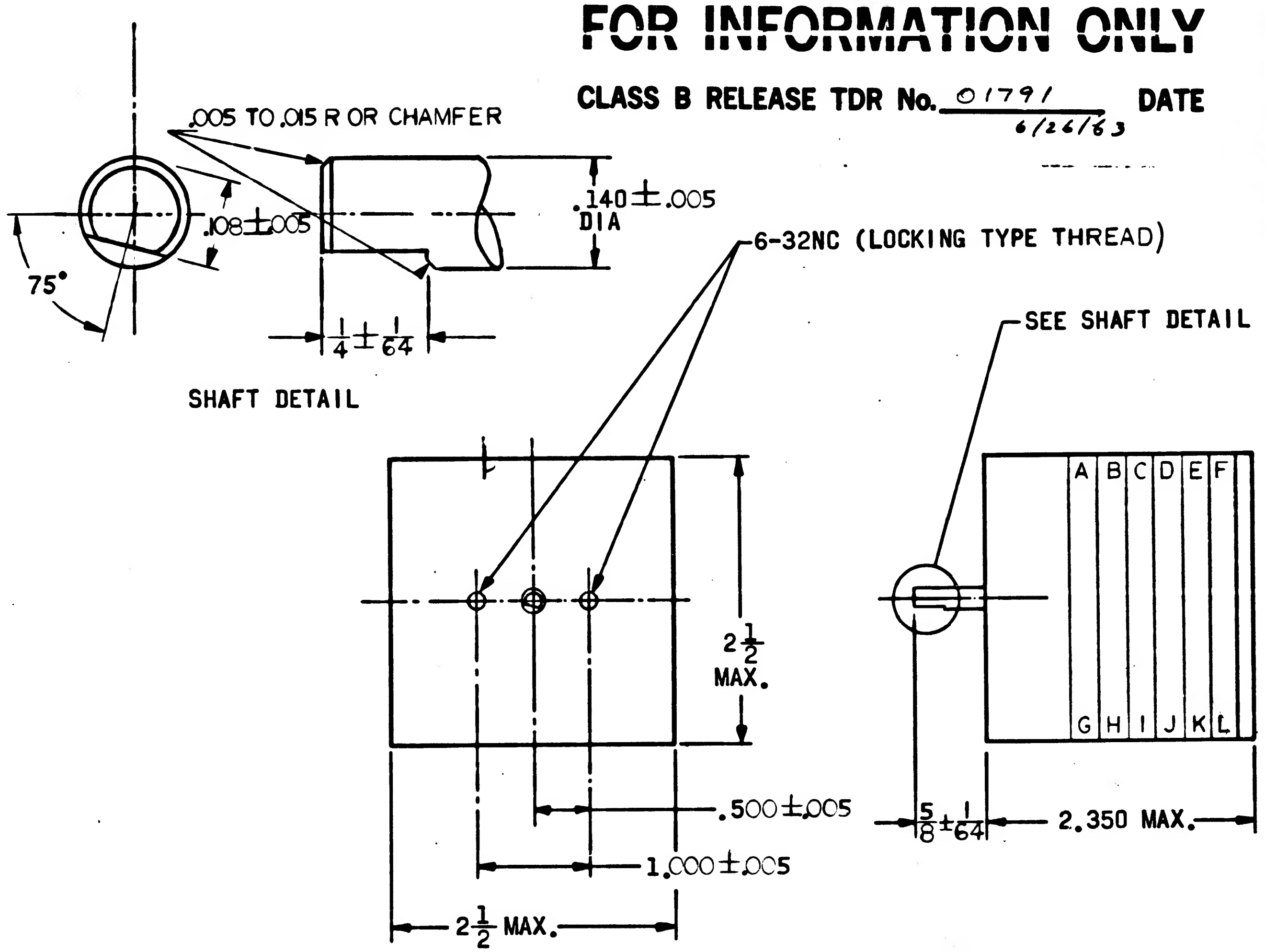
CIRCUIT CONFIGURATION SHALL BE AS SHOWN IN TABLE.

CONTACT ARRANGEMENT: SWITCHING UNITS SHALL BE SPDT.

CONTACT RATINGS: SHALL BE AS SHOWN IN TABLE.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 01791 **DATE** 6/26/63



Ⓐ REPLACED BY REV B WITH CHANGES

SHEET 1	SHEET 2	NEXT ASSY	USED ON
REVISION STATUS OF SHEETS		APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ 1/64	+ .005	+ 2°
− 1/64	− .005	− 2°

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DWG. NO. CONTRACT

DRAWN WEISSERT DATE 28 APR 63

CHECKED Ed Foster 30 APR 63

APPROVAL 6/24/63

APPROVAL

NASA APPROVAL Jack Barnard

MIT APPROVAL 6/26/63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SWITCH ASSEMBLY, ROTARY
(WITH HERMETICALLY
SEALED SWITCH UNITS)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | 1010494

SCALE | SHEET 1 OF 2

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS			
SYM	DESCRIPTION	DATE	APPD.
A	REPLACED BY REV B WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02615	8/14/63	WK

DESIGN REQUIREMENTS:

TEMPERATURE RANGE: OPERATING - 0 TO PLUS 160°F.
NON-OPERATING - MINUS 65°F TO PLUS 160°F.

VIBRATION: PER ND 1002055 PARAGRAPH 4.2.9 EXCEPT 15 G'S INPUT. DURING VIBRATION THERE SHALL BE NO TRANSFER OF CONTACTS FROM ONE POSITION TO ANOTHER AND NO MOMENTARY OPENING OR CLOSING OF CONTACTS IN EXCESS OF 10 MICROSECONDS.

SHOCK: PER ND 1002055 PARAGRAPH 4.2.10 EXCEPT 78 G SAWTOOTH, 11 MILLISECOND PULSE DURATION, NON-OPERATING. NO PARTS SHALL BREAK LOOSE FROM THE SWITCH ASSEMBLY AND THE SWITCH ASSEMBLY SHALL BE RETAINED IN ITS MOUNTED POSITION. DEFORMATION OF THE SWITCH ASSEMBLY AND FAILURE TO OPERATE AFTER SHOCK TESTING ARE ALLOWABLE.

LIFE: PER ND 1002055 PARAGRAPH 4.2.14 EXCEPT TEST SHALL CONSIST OF 25,000 SWITCH ACTUATIONS PERFORMED AT AN ACTUATION CYCLING RATE OF 6 ACTUATIONS PER MINUTE. AFTER LIFE TEST THE SWITCH SHALL BE ELECTRICALLY AND MECHANICALLY FUNCTIONAL AND CONTACT RESISTANCE SHALL BE WITHIN THE LIMITS SPECIFIED IN PARAGRAPH 4.2.6.2.

AMBIENT PRESSURE RANGE: SEA LEVEL TO 10^{-4} MM HG ABSOLUTE.

HIGH ALTITUDE OPERATION: SWITCHES SHALL BE CAPABLE OF OPERATION AT AN AMBIENT PRESSURE OF 10^{-4} MM HG ABSOLUTE FOR 4 DAYS.

OXYGEN ATMOSPHERE: SWITCH ASSEMBLY SHALL BE CAPABLE OF OPERATION IN AN AMBIENT ATMOSPHERE OF 100% OXYGEN AT PRESSURES VARYING FROM 10^{-4} MM HG ABSOLUTE TO 15 PSIA WITHOUT CAUSING EXPLOSION OR TOXIC OR CORROSIVE OUTGASSING.

MATERIALS SHALL NOT EXHIBIT TOXIC OR CORROSIVE OUTGASSING UNDER ANY OF THE ENVIRONMENTAL CONDITIONS.

APPLICATION DATA:

ALL VIEWS, INCLUDING SHAFT DETAIL, ARE SHOWN WITH THE SHAFT IN POSITION ONE AGAINST THE COUNTER CLOCKWISE STOP, WHEN VIEWING THE SWITCH ASSEMBLY FROM THE KNOB END WITH THE MOUNTING HOLES ON THE HORIZONTAL CENTERLINE.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 01791 **DATE** 6/26/63

CONTACT RATINGS

VOLTAGE	AMP.	LOADS
28 DC	3	INDUCTIVE
	5	RESISTIVE

NASA PART NUMBER	NO. POSITIONS	NO. POLES	SWITCH DECKS ACTUATED (C TO ND)		
			POSIT. 1	POSIT. 2	POSIT. 3
1010494 -1	3	12	I	B	A
			J	E	C
				G	D
				H	F
				L	K

Ⓐ REPLACED BY REV B WITH CHANGES

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Weissert DATE 28 APR 63
CHECKED Ed Foster 30 APR 63
APPROVAL
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL 6/26/63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SWITCH ASSEMBLY, ROTARY
(WITH HERMETICALLY
SEALED SWITCH UNITS)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
1010494
SCALE None
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010494 B

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02615	8/14/63	WK

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 1.

UNITS SHALL MEET ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002055 UNLESS MODIFIED OR AMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

BASIC SWITCHES SHALL BE PER NASA DRAWING 1010435.1.

INSPECTION AND ACCEPTANCE:

MECHANICAL REQUIREMENTS:

MATERIALS AND FINISH:

EXPOSED METAL PARTS EXCEPT STRUTNUTS AND SHAFT: CORROSION RESISTANT STEEL, PASSIVATED OR ALUMINUM, ANODIZED.

DETENT WHEEL: DELRIN OR EQUIVALENT

STRUT NUTS: BRASS, NICKEL PLATED.

SHAFT: BRASS, NICKEL PLATED.

SEALING: (100%) LEAKAGE FOR EACH BASIC SWITCH SHALL BE LESS THAN 10^{-8} CC/SEC. (CONVERTED TO LEAKAGE OF HELIUM) AT A PRESSURE DIFFERENTIAL OF ONE ATMOSPHERE. TEST SHALL BE PERFORMED WITH A MASS SPECTROMETER OR OTHER EQUIPMENT CAPABLE OF THE REQUIRED ACCURACY.

DIMENSIONS SHALL BE AS SHOWN.

INDEX: 45° ± 5°, WITH POSITIVE DETENT POSITIONING ACTION.

ROTATION: NON-ADJUSTABLE STOPS SHALL BE POSITIONED SUCH THAT MECHANICAL ROTATION OF THE SWITCH IS LIMITED TO NUMBER OF POSITIONS SPECIFIED PER TABLE WITHOUT OBJECTIONABLE OVERTRAVEL.

ROTATION TORQUE: SHALL BE 2 TO 6 IN.-LB.

SWITCHES ACTUATED IN ANY POSITION DO NOT NECESSARILY OPERATE SIMULTANEOUSLY.

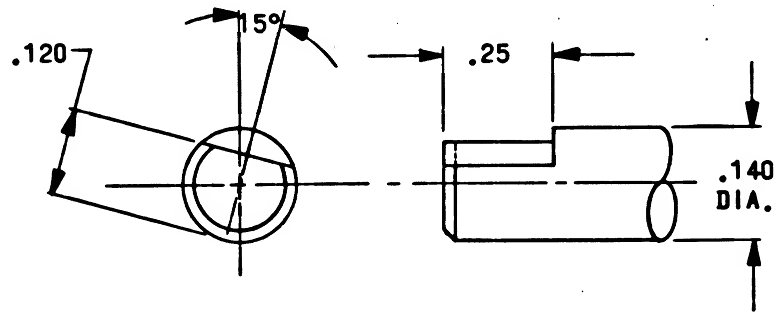
MARKING:

PIECEMARKING: PARTS SHALL BE PERMANENTLY AND LEGIBLY MARKED PER MIL-STD-130 WITH THE NASA DRAWING NUMBER, PLUS DASH NUMBER AND REVISION LETTER. TERMINAL IDENTIFICATION OF THE END TERMINALS AND BASIC SWITCH NUMBERS SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE ENDS OF THE BASIC SWITCHES.

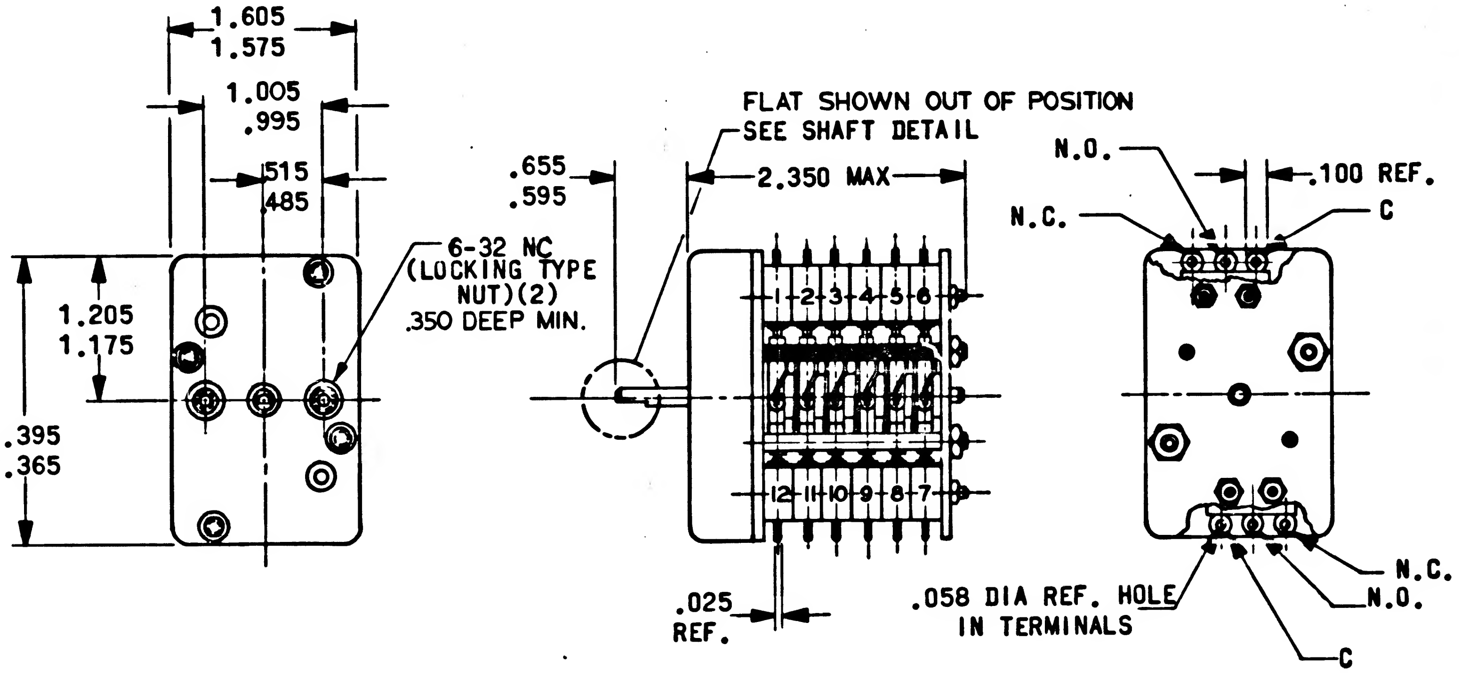
PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION: MANUFACTURER'S NAME OR SYMBOL, NASA PART NUMBER AND REVISION LETTER, MANUFACTURER'S LOT OR SERIAL NUMBER, AND DATE CODE OR DATE OF MANUFACTURE.

MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



SHAFT DETAIL



Ⓑ **REPLACES REV(A)WITH CHANGE**

B	B
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS ±.005 ±.02
ANGLES ± 2° 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB CAMBRIDGE, MASS
DWG NO
CONTRACT NAS9-497
DRAWN W. J. Jacobs DATE 10 JUL 63
CHECKED WILSON 12 JULY 63
APPROVAL J J Kim 8/14/63
APPROVAL
NASA APPROVAL W J Rhine 8-14-63
MIT APPROVAL W Kupfer 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SWITCH ASSEMBLY, ROTARY
(WITH HERMETICALLY
SEALED SWITCH UNITS)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010494
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02015	8/14/63	WK.

INSPECTION AND ACCEPTANCE: (CONTINUED)

ELECTRICAL REQUIREMENTS:

CIRCUIT CONFIGURATION SHALL BE AS SHOWN IN TABLE.

CONTACT ARRANGEMENT: SWITCHING UNITS SHALL BE SPDT.

CONTACT RATINGS: SHALL BE AS SHOWN IN TABLE.

DIELECTRIC WITHSTANDING VOLTAGE: THERE SHALL BE NO BREAKDOWN, DAMAGE, FLASHOVER, OR ARCING WHEN VOLTAGE AS FOLLOWS IS APPLIED BETWEEN THE SPECIFIED POINTS FOR FIVE SECONDS.

SEA LEVEL: 1000 VOLTS RMS AT 60 CPS SHALL BE APPLIED BETWEEN ADJACENT CURRENT CARRYING PARTS AND GROUND OR FAME, AND ANY TWO ADJACENT TERMINALS.

INSULATION RESISTANCE: (100%) SHALL BE A MINIMUM OF 1000 MEGOHMS WHEN MEASURED WITH 100V DC APPLIED FOR A MAXIMUM OF ONE MINUTE BETWEEN TERMINALS AND GROUND OR FRAME, AND MUTUALLY INSULATED PARTS.

CONTACT RESISTANCE: (100%) SHALL BE MEASURED WITH ONE MILLIAMPERE FROM A 6 VOLT DC OPEN CIRCUIT VOLTAGE. THE CONTACT SHALL NOT SWITCH THE MEASURING LOAD. LIMITS SHALL BE ONE OHM MAXIMUM INITIALLY, DURING AND AFTER THE SPECIFIED CYCLES OF LIFE.

DESIGN REQUIREMENTS:

TEMPERATURE RANGE: OPERATING - 0 TO PLUS 160°F. NON-OPERATING - MINUS 65°F TO PLUS 160°F.

VIBRATION: PER ND 1002055 EXCEPT 5-2000 CPS AT 15 G, 0 TO PEAK. DURING VIBRATION THERE SHALL BE NO TRANSFER OF CONTACTS FROM ONE POSITION TO ANOTHER AND NO MEMENTARY OPENING OR CLOSING OF CONTACTS IN EXCESS OF 10 MICROSECONDS.

SHOCK: PER ND 1002055 EXCEPT 78 G HALF SINE WIVE SHOCK INPUT, 11 MILLISECOND PULSE DURATION, NON-OPERATING. NO PARTS SHALL BREAK LOOSE FROM THE SWITCH ASSEMBLY AND THE SWITCH ASSEMBLY SHALL BE RETAINED IN ITS MOUNTED POSITION. DEFORMATION OF THE SWITCH ASSEMBLY AND FAILURE TO OPERATE AFTER SHOCK TESTING ARE ALLOWABLE.

LIFE: PER ND 1002055 EXCEPT TEST SHALL CONSIST OF 25,000 SWITCH ACTUATIONS (12,500 ROTARY CYCLES) PERFORMED AT AN ACTUATION CYCLING RATE OF 2 ACTUATIONS PER MINUTE. AFTER LIFE TEST THE SWITCH SHALL BE ELECTRICALLY AND MECHANICALLY FUNCTIONAL AND CONTACT RESISTANCE SHALL BE WITHIN THE LIMITS OF 500 MILLIOHMS MAXIMUM WHEN CHECKED UNDER ACTUAL LIFE TEST LOAD CONDITIONS.

AMBIENT PRESSURE RANGE: SEA LEVEL TO 10^{-4} MM HG ABSOLUTE.

SHOCK, OPERATING: PER ND 1002055, EXCEPT 50 G'S, 1/2 SINE WAVE SHOCK INPUT, 11 MSEC. PULSE DURATION, OPERATING. DURING OPERATING SHOCK TESTING, THERE SHALL BE NO TRANSFER OF CONTACTS FROM ONE POSITION TO ANOTHER AND NO MOMENTARY OPENING OR CLOSING OF CONTACTS IN EXCESS OF 2 M SECONDS.

DESIGN REQUIREMENTS: (CONTINUED)

HIGH ALTITUDE OPERATION: SWITCHES SHALL BE CAPABLE OF OPERATION AT AN AMBIENT PRESSURE OF 10^{-4} MM HG ABSOLUTE FOR 4 DAYS.

OXYGEN ATMOSPHERE: SWITCH ASSEMBLY SHALL BE CAPABLE OF OPERATION IN AN AMBIENT ATMOSPHERE OF 100% OXYGEN AT PRESSURES VARYING FROM 10^{-4} MM HG ABSOLUTE TO 15 PSIA WITHOUT CAUSING EXPLOSION OR TOXIC OR CORROSIVE OUTGASSING.

MATERIALS SHALL NOT EXHIBIT TOXIC OR CORROSIVE OUTGASSING UNDER ANY OF THE ENVIRONMENTAL CONDITIONS.

NOTES:

1. ALL VIEWS, INCLUDING SHAFT DETAIL, ARE SHOWN WITH THE SHAFT IN POSITION ONE AGAINST THE COUNTER CLOCKWISE STOP, WHEN VIEWING THE SWITCH ASSEMBLY FROM THE KNOB END WITH THE MOUNTING HOLES ON THE HORIZONTAL CENTERLINE.
2. SWITCH MECHANISM POSITION NUMBERS ARE FOR REFERENCE ONLY.

CIRCUIT CONFIGURATION

DASH NO.	SWITCH MECHANISM POSITION NO.	BASIC SWITCHES ACTUATED (N.C. TO C. CIRCUIT MADE)
-1	1	1,2
	2	3,4,5,6,7
	3	8,9,10,11,12

CONTACT RATINGS

VOLTAGE	AMP.	LOADS
28 DC	3	INDUCTIVE
	5	RESISTIVE

NASA PART NUMBER	NO. POSITIONS	NO. SWITCH UNITS	NO. OF SWITCHES ACTUATED POSIT. 1	NO. OF SWITCHES ACTUATED POSIT. 2	NO. OF SWITCHES ACTUATED POSIT. 3
1010494-1	3	12	2	5	5

Ⓑ **REPLACES REV(A)WITH CHANGE**

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO
CONTRACT NAS9-497
DRAWN G. L. Jacobs DATE 10 JUL 63
CHECKED WILSON 12 JULY 63
APPROVAL J. J. Kem 8/14/63
APPROVAL
NASA APPROVAL W. J. Rhine 8-14-63
MIT APPROVAL W. Kupfer for H. Cary 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SWITCH ASSEMBLY, ROTARY
(WITH HERMETICALLY
SEALED SWITCH UNITS)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010494
SCALE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02615	8/14/63	WK
C	REVISED PER TDRR 04536	11-13-63 LK	WK

REQUIREMENTS:

1 GENERAL:

A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 1.

C. UNITS SHALL MEET ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002055 UNLESS MODIFIED OR AMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

D. BASIC SWITCHES SHALL BE PER NASA DRAWING 1010435.1.

2. INSPECTION AND ACCEPTANCE:

A. MECHANICAL REQUIREMENTS:

1 MATERIALS AND FINISH:

(a) EXPOSED METAL PARTS EXCEPT STRUTNUTS AND SHAFT: CORROSION RESISTANT STEEL, PASSIVATED OR ALUMINUM, ANODIZED.

(b) DETENT WHEEL: DELRIN OR EQUIVALENT

(c) STRUT NUTS: BRASS, NICKEL PLATED.

(d) SHAFT: BRASS, NICKEL PLATED.

2 SEALING: (100%) LEAKAGE FOR EACH BASIC SWITCH SHALL BE LESS THAN 10^{-8} CC/SEC. (CONVERTED TO LEAKAGE OF HELIUM) AT A PRESSURE DIFFERENTIAL OF ONE ATMOSPHERE. TEST SHALL BE PERFORMED WITH A MASS SPECTROMETER OR OTHER EQUIPMENT CAPABLE OF THE REQUIRED ACCURACY.

3 DIMENSIONS SHALL BE AS SHOWN.

4 INDEX: 45° ± 5°, WITH POSITIVE DETENT POSITIONING ACTION.

5 ROTATION: NON-ADJUSTABLE STOPS SHALL BE POSITIONED SUCH THAT MECHANICAL ROTATION OF THE SWITCH IS LIMITED TO NUMBER OF POSITIONS SPECIFIED PER TABLE WITHOUT OBJECTIONABLE OVERTRAVEL.

6 ROTATION TORQUE: SHALL BE 2 TO 6 IN.-LB. SWITCHES ACTUATED IN ANY POSITION DO NOT NECESSARILY OPERATE SIMULTANEOUSLY.

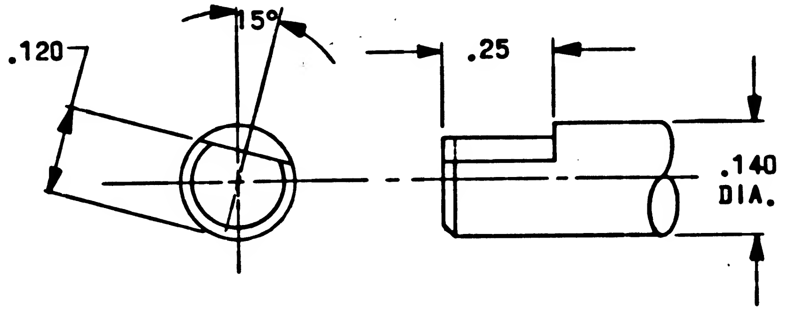
7 MARKING:

(a) PIECEMARKING: PARTS SHALL BE PERMANENTLY AND LEGIBLY MARKED PER MIL-STD-130 WITH THE NASA DRAWING NUMBER, PLUS DASH NUMBER AND REVISION LETTER. TERMINAL IDENTIFICATION OF THE END TERMINALS AND BASIC SWITCH NUMBERS SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE ENDS OF THE BASIC SWITCHES.

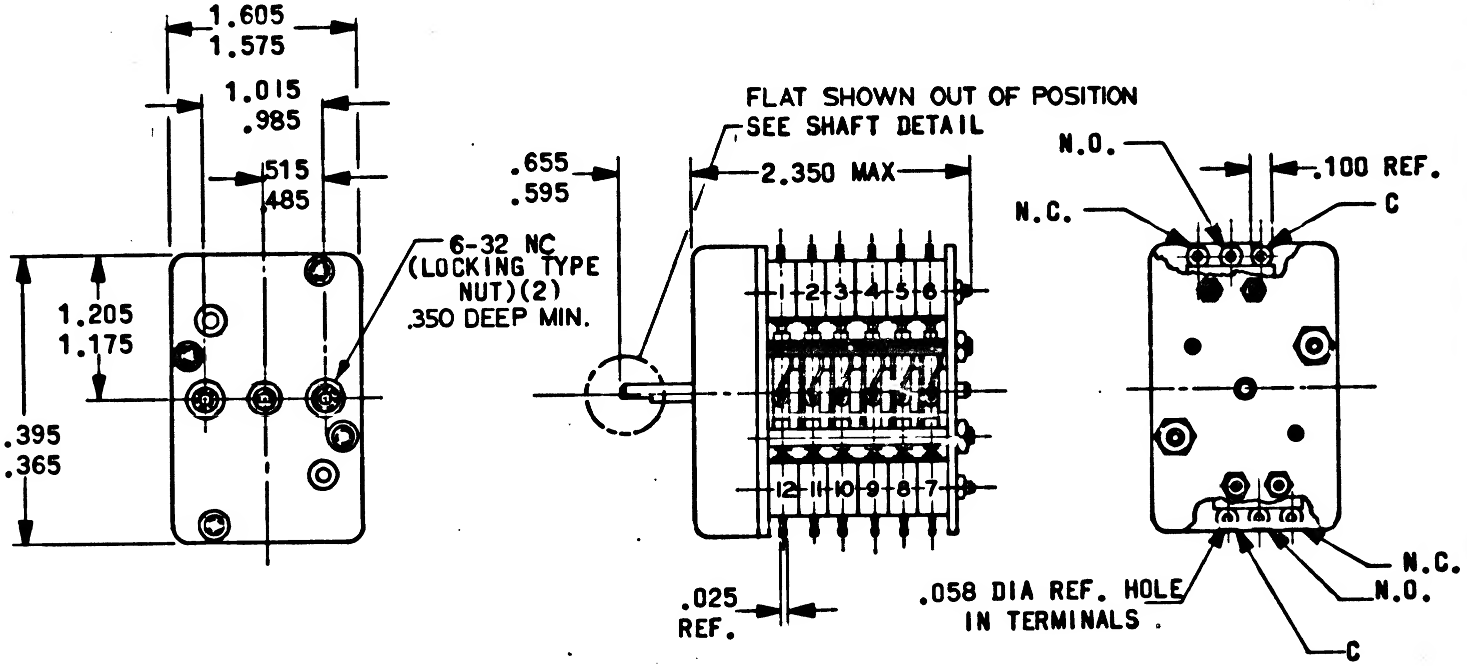
(b) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION: MANUFACTURER'S NAME OR SYMBOL, NASA PART NUMBER AND REVISION LETTER, MANUFACTURER'S LOT OR SERIAL NUMBER, AND DATE CODE OR DATE OF MANUFACTURE.

(c) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



SHAFT DETAIL



Ⓑ REPLACES REV(A)WITH CHANGE

C	C
B	B
SHEET 1	SHEET 2

REVISION STATUS OF SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS ±.005 ±.02
ANGLES ± 2° 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS9-497
DRAWN Z. L. Jacobs DATE 10 JUL 63
CHECKED WILSON 12 JULY 63
APPROVAL J. Kiss 8/14/63
APPROVAL
NASA APPROVAL W. J. Rhine 8-14-63
MIT APPROVAL W Kupfer 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SWITCH ASSEMBLY, ROTARY
(WITH HERMETICALLY
SEALED SWITCH UNITS)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010494
SCALE NONE
WT
SHEET 1 OF 2

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02615	8/14/63	WK.
C	REVISED PER TDRR 04536	11-13-63 LK	WK.

INSPECTION AND ACCEPTANCE: (CONTINUED)

B. ELECTRICAL REQUIREMENTS:

1 CIRCUIT CONFIGURATION SHALL BE AS SHOWN IN TABLE. CONTACT ARRANGEMENT: SWITCHING UNITS SHALL BE SPDT.

2 CONTACT RATINGS: SHALL BE AS SHOWN IN TABLE.

3 DIELECTRIC WITHSTANDING VOLTAGE: THERE SHALL BE NO BREAKDOWN, DAMAGE, FLASHOVER, OR ARCING WHEN VOLTAGE AS FOLLOWS IS APPLIED BETWEEN THE SPECIFIED POINTS FOR FIVE SECONDS.

(a) SEA LEVEL: 1000 VOLTS RMS AT 60 CPS SHALL BE APPLIED BETWEEN ADJACENT CURRENT CARRYING PARTS AND GROUND OR FRAME AND ANY TWO ADJACENT TERMINALS.

4 INSULATION RESISTANCE: (100%) SHALL BE A MINIMUM OF 1000 MEGOHMS WHEN MEASURED WITH 100V DC APPLIED FOR A MAXIMUM OF ONE MINUTE BETWEEN TERMINALS AND GROUND OR FRAME, AND MUTUALLY INSULATED PARTS.

5 CONTACT RESISTANCE: (100%) SHALL BE MEASURED WITH ONE MILLIAMPERE FROM A 6 VOLT DC OPEN CIRCUIT VOLTAGE. THE CONTACT SHALL NOT SWITCH THE MEASURING LOAD. LIMITS SHALL BE ONE OHM MAXIMUM INITIALLY, DURING AND AFTER THE SPECIFIED CYCLES OF LIFE.

3 DESIGN REQUIREMENTS:

A. TEMPERATURE RANGE: OPERATING - 0 TO PLUS 160°F. NON-OPERATING - MINUS 65°F TO PLUS 160°F.

B. VIBRATION: PER ND 1002055 EXCEPT 5-2000 CPS AT 15 G, 0 TO PEAK. DURING VIBRATION THERE SHALL BE NO TRANSFER OF CONTACTS FROM ONE POSITION TO ANOTHER AND NO MEMENTARY OPENING OR CLOSING OF CONTACTS IN EXCESS OF 10 MICROSECONDS.

C. SHOCK: PER ND 1002055 EXCEPT 78 G HALF SINE WIVE SHOCK INPUT, 11 MILLISECOND PULSE DURATION, NON-OPERATING. NO PARTS SHALL BREAK LOOSE FROM THE SWITCH ASSEMBLY AND THE SWITCH ASSEMBLY SHALL BE RETAINED IN ITS MOUNTED POSITION. DEFORMATION OF THE SWITCH ASSEMBLY AND FAILURE TO OPERATE AFTER SHOCK TESTING ARE ALLOWABLE.

D. LIFE: PER ND 1002055 EXCEPT TEST SHALL CONSIST OF 25,000 SWITCH ACTUATIONS (12,500 ROTARY CYCLES) PERFORMED AT AN ACTUATION CYCLING RATE OF 2 ACTUATIONS PER MINUTE. AFTER LIFE TEST THE SWITCH SHALL BE ELECTRICALLY AND MECHANICALLY FUNCTIONAL AND CONTACT RESISTANCE SHALL BE WITHIN THE LIMITS OF 500 MILLIOHMS MAXIMUM WHEN CHECKED UNDER ACTUAL LIFE TEST LOAD CONDITIONS.

E. AMBIENT PRESSURE RANGE: SEA LEVEL TO 10^{-4} MM HG ABSOLUTE.

F. SHOCK, OPERATING: PER ND 1002055, EXCEPT 50 G'S, 1/2 SINE WAVE SHOCK INPUT, 11 MSEC. PULSE DURATION, OPERATING. DURING OPERATING SHOCK TESTING, THERE SHALL BE NO TRANSFER OF CONTACTS FROM ONE POSITION TO ANOTHER AND NO MOMENTARY OPENING OR CLOSING OF CONTACTS IN EXCESS OF 2 M SECONDS.

MASTER

DESIGN REQUIREMENTS: (CONTINUED)

G. HIGH ALTITUDE OPERATION: SWITCHES SHALL BE CAPABLE OF OPERATION AT AN AMBIENT PRESSURE OF 10^{-4} MM HG ABSOLUTE FOR 4 DAYS.

H. OXYGEN ATMOSPHERE: SWITCH ASSEMBLY SHALL BE CAPABLE OF OPERATION IN AN AMBIENT ATMOSPHERE OF 100% OXYGEN AT PRESSURES VARYING FROM 10^{-4} MM HG ABSOLUTE TO 15 PSIA WITHOUT CAUSING EXPLOSION OR TOXIC OR CORROSIVE OUTGASSING.

J. MATERIALS SHALL NOT EXHIBIT TOXIC OR CORROSIVE OUTGASSING UNDER ANY OF THE ENVIRONMENTAL CONDITIONS.

NOTES:

1. ALL VIEWS, INCLUDING SHAFT DETAIL, ARE SHOWN WITH THE SHAFT IN POSITION ONE AGAINST THE COUNTER CLOCKWISE STOP, WHEN VIEWING THE SWITCH ASSEMBLY FROM THE KNOB END WITH THE MOUNTING HOLES ON THE HORIZONTAL CENTERLINE.
2. SWITCH MECHANISM POSITION NUMBERS ARE FOR REFERENCE ONLY.

CIRCUIT CONFIGURATION

DASH NO.	SWITCH MECHANISM POSITION NO.	BASIC SWITCHES ACTUATED (N.C. TO C. CIRCUIT MADE)
-1	1	1,2
	2	3,4,5,6,7
	3	8,9,10,11,12

CONTACT RATINGS

VOLTAGE	AMP.	LOADS
28 DC	3	INDUCTIVE
	5	RESISTIVE

NASA PART NUMBER	NO. POSITIONS	NO. SWITCH UNITS	NO. OF SWITCHES ACTUATED		
			POSIT. 1	POSIT. 2	POSIT. 3
1010494-1	3	12	2	5	5

Ⓑ REPLACES REV(A)WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB CAMBRIDGE, MASS
DWG. NO.
CONTRACT NAS9-497
DRAWN G. L. Jacobs DATE 10 JUL 63
CHECKED WILSON 12 JULY 63
APPROVAL 8/14/63
APPROVAL
NASA APPROVAL 8-14-63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SWITCH ASSEMBLY, ROTARY
(WITH HERMETICALLY
SEALED SWITCH UNITS)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010494
SCALE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

D	1010494

[illegible]

REQUIREMENTS:

1 GENERAL:

A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 1.

C. UNITS SHALL MEET ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002055 UNLESS MODIFIED OR AMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

D. BASIC SWITCHES SHALL BE PER NASA DRAWING 1010435.1.

2. INSPECTION AND ACCEPTANCE:

2. MECHANICAL REQUIREMENTS:

1 MATERIALS AND FINISH:

(a) EXPOSED METAL PARTS EXCEPT STRUTNUTS AND SHAFT: CORROSION RESISTANT STEEL, PASSIVATED OR ALUMINUM, ANODIZED.

(b) DETENT WHEEL: DELRIN OR EQUIVALENT

(c) STRUT NUTS: BRASS, NICKEL PLATED.

(d) SHAFT: BRASS, NICKEL PLATED.

2 SEALING: (100%) LEAKAGE FOR EACH BASIC SWITCH SHALL BE LESS THAN 10^{-8} CC/SEC. (CONVERTED TO LEAKAGE OF HELIUM) AT A PRESSURE DIFFERENTIAL OF ONE ATMOSPHERE. TEST SHALL BE PERFORMED WITH A MASS SPECTROMETER OR OTHER EQUIPMENT CAPABLE OF THE REQUIRED ACCURACY.

3 DIMENSIONS SHALL BE AS SHOWN.

4 INDEX: 45° ± 5°, WITH POSITIVE DETENT POSITIONING ACTION.

5 ROTATION: NON-ADJUSTABLE STOPS SHALL BE POSITIONED SUCH THAT MECHANICAL ROTATION OF THE SWITCH IS LIMITED TO NUMBER OF POSITIONS SPECIFIED PER TABLE WITHOUT OBJECTIONABLE OVERTRAVEL.

6 ROTATION TORQUE: SHALL BE 2 TO 4 IN.-LB. SWITCHES ACTUATED IN ANY POSITION DO NOT NECESSARILY OPERATE SIMULTANEOUSLY.

7 MARKING:

(a) PIECEMARKING: PARTS SHALL BE PERMANENTLY AND LEGIBLY MARKED PER ND 1002019 WITH THE NASA DRAWING NUMBER, PLUS DASH NUMBER AND REVISION LETTER. TERMINAL IDENTIFICATION OF THE END TERMINALS AND BASIC SWITCH NUMBERS SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE ENDS OF THE BASIC SWITCHES.

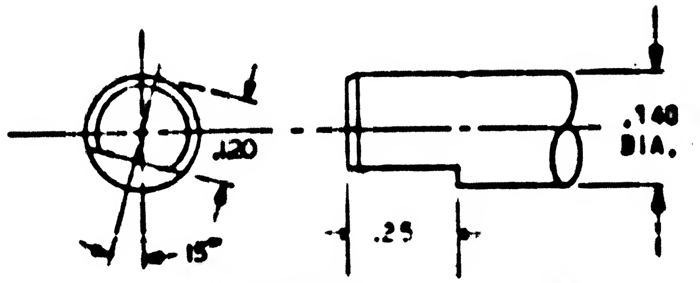
(b) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION: MANUFACTURER'S NAME OR SYMBOL, NASA PART NUMBER AND REVISION LETTER, MANUFACTURER'S LOT OR SERIAL NUMBER, AND DATE CODE OR DATE OF MANUFACTURE PER MIL-STD-129.

(c) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

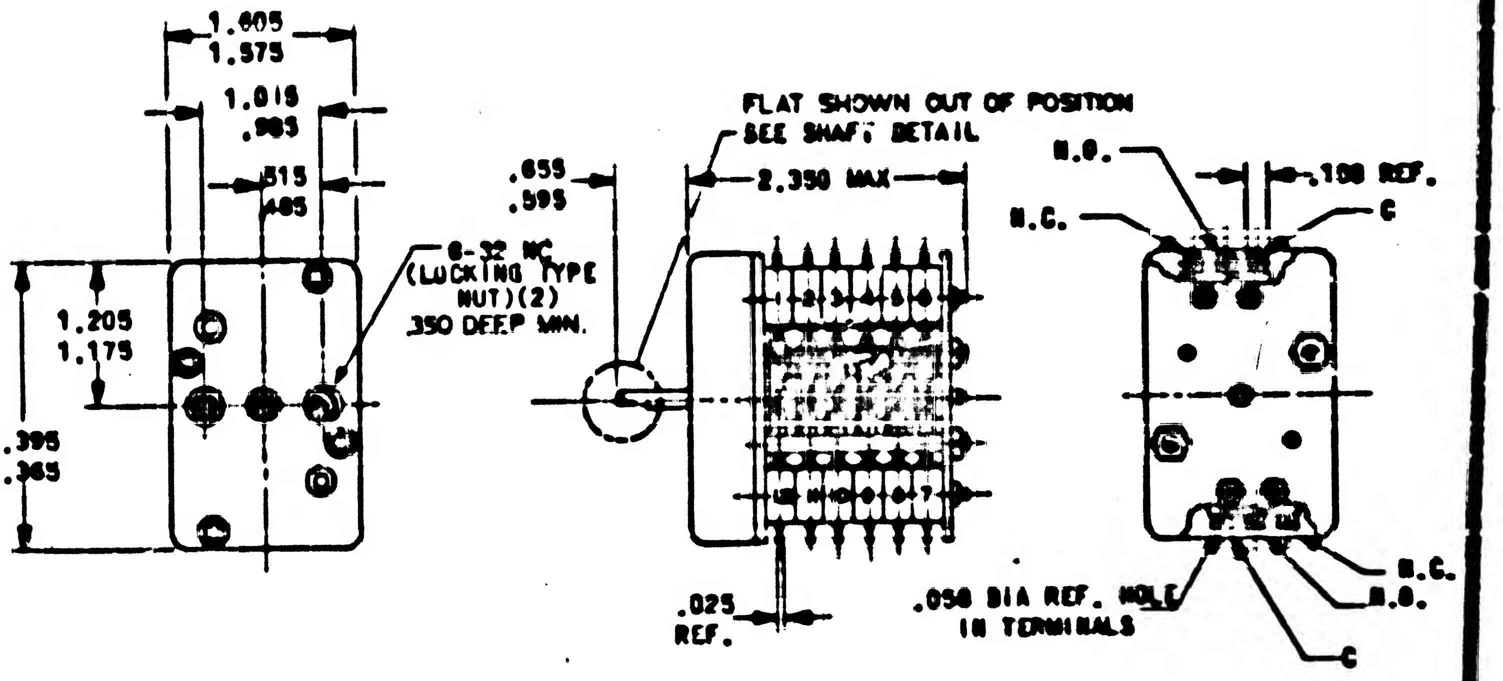
PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02615	8/7/63	WK
C	REVISED PER TDRR 0456	11/13/63	
D	REVISED PER TDRR 06276		



SHAFT DETAIL



Ⓑ REPLACES REV(A) WITH CHANGE

D	C
C	C
B	B
SHEET 1	SHEET 2

REVISION STATUS OF SHEETS

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS .005 ±.02 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
NAS9-4065
DRAWN DATE
CHECKED Wilson 12 Jul 63
APPROVAL
APPROVAL
NASA APPROVAL 5-14-67
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SWITCH ASSEMBLY, ROTARY
(WITH HERMETICALLY
SEALED SWITCH UNITS)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO
SIZE C
NASA DRAWING NO 1010494
SCALE NONE
WT
SHEET 1 OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010494 E

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02615	8/14/63	WK
C	REVISED PER TDRR 04536	11-13-63 LK	
D	REVISED PER TDRR 06276	2-18-64	WK
E	REVISED PER TDRR 10047	6/16/64	

REQUIREMENTS:

1 **GENERAL:**

A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 1.

C. UNITS SHALL MEET ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002055 UNLESS MODIFIED OR AMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

D. BASIC SWITCHES SHALL BE PER NASA DRAWING 1010435.1.

2. **INSPECTION AND ACCEPTANCE:**

A. MECHANICAL REQUIREMENTS:

1 MATERIALS AND FINISH:

(a) EXPOSED METAL PARTS EXCEPT STRUTNUTS SHAFT AND FRONT HOUSING: CORROSION RESISTANT STEEL, PASSIVATED OR ALUMINUM, ANODIZED.

(b) DETENT WHEEL: DELRIN OR EQUIVALENT

(c) STRUT NUTS: BRASS, NICKEL PLATED.

(d) SHAFT: CRES (TYPE 416, HARDENED, PASSIVATED)

(e) FRONT HOUSING: ALUMINUM ALODINED PER MIL-C-5541.

2 SEALING: (100%) LEAKAGE FOR EACH BASIC SWITCH SHALL BE LESS THAN 10^{-8} CC/SEC. (CONVERTED TO LEAKAGE OF HELIUM) AT A PRESSURE DIFFERENTIAL OF ONE ATMOSPHERE. TEST SHALL BE PERFORMED WITH A MASS SPECTROMETER OR OTHER EQUIPMENT CAPABLE OF THE REQUIRED ACCURACY.

3 DIMENSIONS SHALL BE AS SHOWN.

4 INDEX: 45° ± 5°, WITH POSITIVE DETENT POSITIONING ACTION.

5 ROTATION: NON-ADJUSTABLE STOPS SHALL BE POSITIONED SUCH THAT MECHANICAL ROTATION OF THE SWITCH IS LIMITED TO NUMBER OF POSITIONS SPECIFIED PER TABLE WITHOUT OBJECTIONABLE OVERTRAVEL.

6 ROTATION TORQUE: SHALL BE 2 TO 6 IN.-LB. SWITCHES ACTUATED IN ANY POSITION DO NOT NECESSARILY OPERATE SIMULTANEOUSLY.

7 MARKING:

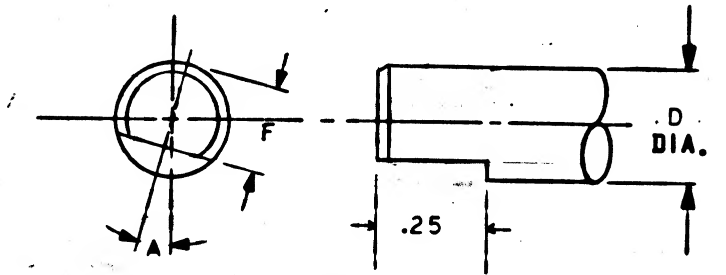
(a) PIECEMARKING: PARTS SHALL BE PERMANENTLY AND LEGIBLY MARKED PER ND 1002019 WITH THE NASA DRAWING NUMBER, PLUS DASH NUMBER AND REVISION LETTER. TERMINAL IDENTIFICATION OF THE END TERMINALS AND BASIC SWITCH NUMBERS SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE ENDS OF THE BASIC SWITCHES. (SEE NOTE 3)

(b) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION: MANUFACTURER'S NAME OR SYMBOL, NASA PART NUMBER AND REVISION LETTER, MANUFACTURER'S LOT OR SERIAL NUMBER, AND DATE CODE OR DATE OF MANUFACTURE PER MIL-STD-129.

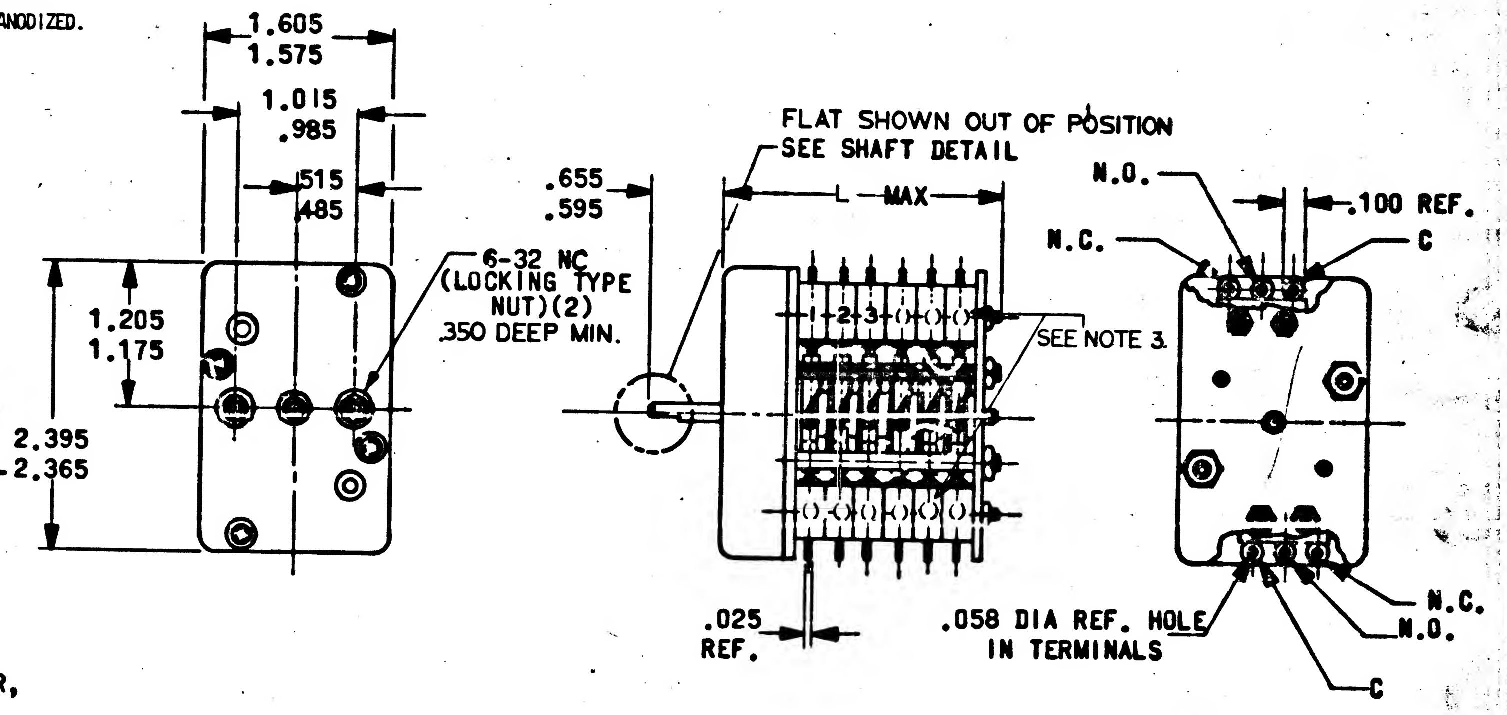
(c) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

8. SHAFT FLAT LOCATION ANGLE A (SEE SHAFT DETAIL) IS MEASURED FROM THE LOWER SEGMENT OF THE VERTICAL CENTER LINE CLOCKWISE TO THE FLAT LOCATION WITH THE SHAFT IN SWITCH MECHANISM POSITION ONE AGAINST THE COUNTER CLOCKWISE STOP WHEN VIEWING THE SWITCH ASSEMBLY FROM THE KNOB END WITH THE MOUNTING HOLES ON THE HORIZONTAL CENTERLINE AND BASIC SWITCH NUMBER ONE AT THE TOP OF THE ASSEMBLY.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING.



SHAFT DETAIL



Ⓑ **REPLACES REV(A)WITH CHANGE**

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS ±.005 ±.02
ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS9-497

DRAWN W. L. Jacob DATE 10 JUL 63
CHECKED WILSON 12 JULY 63
APPROVAL J. Kiernan 8/14/63
APPROVAL
NASA APPROVAL W. J. Rhine 8-14-63
MIT APPROVAL W. Kupfer 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SWITCH ASSEMBLY, ROTARY
(WITH HERMETICALLY
SEALED SWITCH UNITS)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010494
SCALE NONE
WT
SHEET 1 OF 3

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02615	8/14/63	WK.
C	REVISED PER TDRR 04536	11-13-63 LK	WK.
E	REVISED PER TDRR 10047		

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

INSPECTION AND ACCEPTANCE: (CONTINUED)

B. ELECTRICAL REQUIREMENTS:

1 CIRCUIT CONFIGURATION SHALL BE AS SHOWN IN TABLE. CONTACT ARRANGEMENT: SWITCHING UNITS SHALL BE SPDT.
CONTACT RATINGS: SHALL BE AS SHOWN IN TABLE.

2 DIELECTRIC WITHSTANDING VOLTAGE: THERE SHALL BE NO BREAKDOWN, DAMAGE, FLASHOVER, OR ARCING WHEN VOLTAGE AS FOLLOWS IS APPLIED BETWEEN THE SPECIFIED POINTS FOR FIVE SECONDS.

3 (a) SEA LEVEL: 1000 VOLTS RMS AT 60 CPS SHALL BE APPLIED BETWEEN ADJACENT CURRENT CARRYING PARTS AND GROUND OR FRAME AND ANY TWO ADJACENT TERMINALS.

4 INSULATION RESISTANCE: (100%) SHALL BE A MINIMUM OF 1000 MEGOHMS WHEN MEASURED WITH 100V DC APPLIED FOR A MAXIMUM OF ONE MINUTE BETWEEN TERMINALS AND GROUND OR FRAME, AND MUTUALLY INSULATED PARTS.

5 CONTACT RESISTANCE: (100%) SHALL BE MEASURED WITH ONE MILLIAMPERE FROM A 6 VOLT DC OPEN CIRCUIT VOLTAGE. THE CONTACT SHALL NOT SWITCH THE MEASURING LOAD. LIMITS SHALL BE ONE OHM MAXIMUM INITIALLY, DURING AND AFTER THE SPECIFIED CYCLES OF LIFE.

3 DESIGN REQUIREMENTS:

A. TEMPERATURE RANGE: OPERATING - 0 TO PLUS 160°F. NON-OPERATING - MINUS 65°F TO PLUS 160°F.

B. VIBRATION: PER ND 1002055 EXCEPT 5-2000 CPS AT 15 G, 0 TO PEAK. DURING VIBRATION THERE SHALL BE NO TRANSFER OF CONTACTS FROM ONE POSITION TO ANOTHER AND NO MEMENTARY OPENING OR CLOSING OF CONTACTS IN EXCESS OF 10 MICROSECONDS.

C. SHOCK: PER ND 1002055 EXCEPT 78 G HALF SINE WIVE SHOCK INPUT, 11 MILLISECOND PULSE DURATION, NON-OPERATING. NO PARTS SHALL BREAK LOOSE FROM THE SWITCH ASSEMBLY AND THE SWITCH ASSEMBLY SHALL BE RETAINED IN ITS MOUNTED POSITION. DEFORMATION OF THE SWITCH ASSEMBLY AND FAILURE TO OPERATE AFTER SHOCK TESTING ARE ALLOWABLE.

D. LIFE: PER ND 1002055 EXCEPT TEST SHALL CONSIST OF 25,000 SWITCH ACTUATIONS (12,500 ROTARY CYCLES) PERFORMED AT AN ACTUATION CYCLING RATE OF 2 ACTUATIONS PER MINUTE. AFTER LIFE TEST THE SWITCH SHALL BE ELECTRICALLY AND MECHANICALLY FUNCTIONAL AND CONTACT RESISTANCE SHALL BE WITHIN THE LIMITS OF 500 MILLIOHMS MAXIMUM WHEN CHECKED UNDER ACTUAL LIFE TEST LOAD CONDITIONS.

E. AMBIENT PRESSURE RANGE: SEA LEVEL TO 10^{-4} MM HG ABSOLUTE.

F. SHOCK, OPERATING: PER ND 1002055, EXCEPT 50 G'S, 1/2 SINE WAVE SHOCK INPUT, 11 MSEC. PULSE DURATION, OPERATING. DURING OPERATING SHOCK TESTING, THERE SHALL BE NO TRANSFER OF CONTACTS FROM ONE POSITION TO ANOTHER AND NO MOMENTARY OPENING OR CLOSING OF CONTACTS IN EXCESS OF 2 M SECONDS.

DESIGN REQUIREMENTS: (CONTINUED)

G. HIGH ALTITUDE OPERATION: SWITCHES SHALL BE CAPABLE OF OPERATION AT AN AMBIENT PRESSURE OF 10^{-4} MM HG ABSOLUTE FOR 4 DAYS.

H. OXYGEN ATMOSPHERE: SWITCH ASSEMBLY SHALL BE CAPABLE OF OPERATION IN AN AMBIENT ATMOSPHERE OF 100% OXYGEN AT PRESSURES VARYING FROM 10^{-4} MM HG ABSOLUTE TO 15 PSIA WITHOUT CAUSING EXPLOSION OR TOXIC OR CORROSIVE OUTGASSING.

J. MATERIALS SHALL NOT EXHIBIT TOXIC OR CORROSIVE OUTGASSING UNDER ANY OF THE ENVIRONMENTAL CONDITIONS.

NOTES:

1. ALL VIEWS, INCLUDING SHAFT DETAIL, ARE SHOWN WITH THE SHAFT IN POSITION ONE AGAINST THE COUNTER CLOCKWISE STOP, WHEN VIEWING THE SWITCH ASSEMBLY FROM THE KNOB END WITH THE MOUNTING HOLES ON THE HORIZONTAL CENTERLINE.
2. SWITCH MECHANISM POSITION NUMBERS ARE FOR REFERENCE ONLY.
3. BASIC SWITCHES SHALL BE NUMBERED, STARTING WITH SWITCH NUMBER ONE IN THE UPPER BANK AND NEAREST THE MOUNTING SURFACE, CONTINUE CONSECUTIVELY ALONG THE UPPER BANK TO THE REAR OF THE SWITCH ASSEMBLY, AND RETURN ALONG THE LOWER BANK TO THE FRONT OF THE SWITCH ASSEMBLY. THE LAST BASIC SWITCH SHALL BE IN THE LOWER BANK AND NEAREST THE MOUNTING SURFACE.
   (a) ORIENTATION OF SWITCH BANKS IS WITH MOUNTING HOLES ON THE HORIZONTAL CENTERLINE.
   (b) THE TOTAL NUMBER OF BASIC SWITCHES SHALL BE EQUALLY DIVIDED BETWEEN THE UPPER AND LOWER BANKS. AN ODD TOTAL NUMBER OF BASIC SWITCHES SHALL HAVE ONE SPACER OR DUMMY SWITCH ADDED TO THE TOTAL TO ALLOW EQUAL DIVISION. THE SPACER OR DUMMY SWITCH SHALL NOT BE NUMBERED, AND SHALL BE LOCATED IN THE LOWER BANK FURTHEST FROM THE MOUNTING SURFACE.

CONTACT RATINGS

VOLTAGE	AMP.	LOADS
28 DC	3	INDUCTIVE
	5	RESISTIVE

MASTER

Ⓑ REPLACES REV(A)WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO
CONTRACT NAS9-497
DRAWN G. L. Jacobs DATE 10 JUL 63
CHECKED WILSON 12 JULY 63
APPROVAL J. J. Kane 8/14/63
APPROVAL
NASA APPROVAL W. J. 8-14-63
MIT APPROVAL W. Kupfer 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SWITCH ASSEMBLY, ROTARY
(WITH HERMETICALLY
SEALED SWITCH UNITS)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010494
SCALE	WT	SHEET 2 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWING , SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

E 1010494

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
E	THIS SHEET ADDED PER TDRR 10047		

NASA PART NUMBER	L MAX	A (SEE REQ. 2.A.8)	D	F	NO. POSITIONS	NO. SWITCH UNITS	NO. OF SWITCHES ACTUATED			
							POSIT. 1	POSIT. 2	POSIT. 3	POSIT. 4
1010494-1	2.350	15°	.140	.120	3	12	2	5	5	-
1010494-2	1.870	262.5°	.250	.215	4	8	4	3	1	2
1010494-3	2.350	15°	.250	.215	3	12	2	5	5	-

CIRCUIT CONFIGURATION

DASH NO.	SWITCH MECHANISM POSITION NO.	BASIC SWITCHES ACTUATED (N.C. TO C. CIRCUIT MADE)
-1	1	1,2
	2	3,4,5,6,7
	3	8,9,10,11,12
-2	1	3,5,6 AND 7
	2	2,6 AND 7
	3	1
	4	4 AND 8
-3	1	1,2
	2	3,4,5,6,7
	3	8,9,10,11,12

Ⓔ THIS SHEET ADDED

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

HEAT TREATMENT

FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS. NAS9-
DWG. NO. CONTRACT 497

DRAWN A. Addonizio Jr. DATE 10 June 64
CHECKED A. Marto 6-15-64
APPROVAL 6/15/64
APPROVAL

NASA APPROVAL 6/16/64

MIT APPROVAL 6/16/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SWITCH ASSEMBLY, ROTARY
(WITH HERMETICALLY
SEALED SWITCH UNITS)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010494
SCALE
WT
SHEET 3 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010494

SYM	REVISIONS DESCRIPTION	DATE	APPD.

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.

UNITS SHALL MEET ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002055 UNLESS MODIFIED OR AMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING.

EACH POLE OF THE SWITCH ASSEMBLY SHALL CONSIST OF ONE BASIC SWITCH PER 1010435-001.

INSPECTION & ACCEPTANCE:

MECHANICAL REQUIREMENTS:

MATERIALS AND FINISH:

EXPOSED METAL PARTS: CORROSION RESISTANT STEEL, PASSIVATED.

DETENT WHEEL: DELRIN

SEALING: BASIC SWITCHES SHALL BE BACKFILLED WITH AN INERT GAS AND HERMETICALLY SEALED.

DIMENSIONS SHALL BE AS SHOWN.

INDEX: 45° ± 5°, WITH POSITIVE DETENT POSITIONING ACTION.

ROTATION: NON-ADJUSTABLE STOPS SHALL BE POSITIONED SUCH THAT MECHANICAL ROTATION OF THE SWITCH IS LIMITED TO NUMBER OF POSITIONS SPECIFIED PER TABLE WITHOUT OBJECTIONABLE OVERTRAVEL.

ROTATION TORQUE: SHALL BE 2 TO 6 IN.-LB.

SWITCHES ACTUATED IN ANY POSITION DO NOT NECESSARILY OPERATE SIMULTANEOUSLY.

MARKING: ASSEMBLIES SHALL BE PIECEMARKED IN ACCORDANCE WITH MIL-STD-130. TERMINAL IDENTIFICATION SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PARTS.

ELECTRICAL REQUIREMENTS:

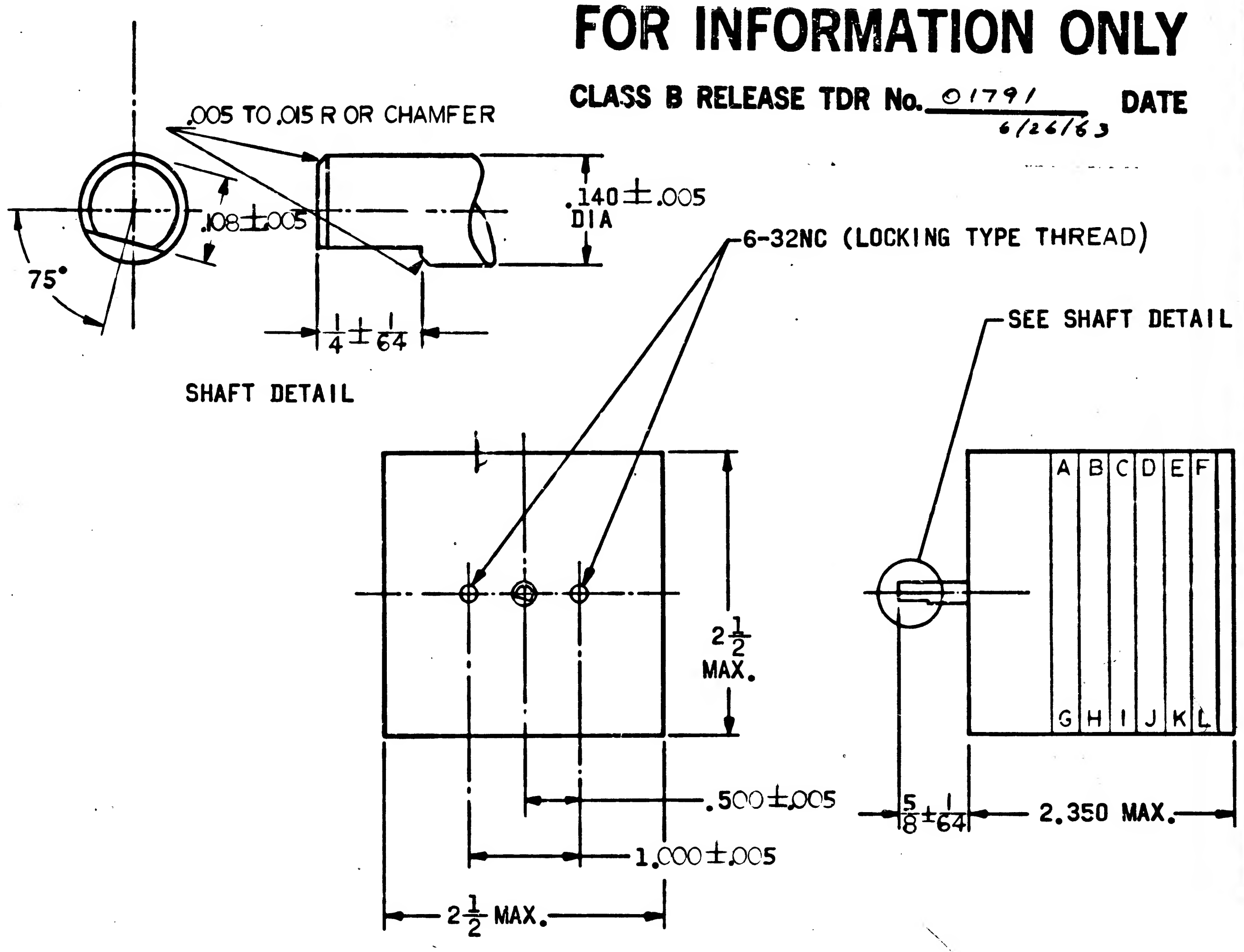
CIRCUIT CONFIGURATION SHALL BE AS SHOWN IN TABLE.

CONTACT ARRANGEMENT: SWITCHING UNITS SHALL BE SPDT.

CONTACT RATINGS: SHALL BE AS SHOWN IN TABLE.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 01791 **DATE** 6/26/63



SHEET 1	SHEET 2	NEXT ASSY	USED ON
REVISION STATUS OF SHEETS		APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + 1/64 − 1/64
DECIMALS + .005 − .005
ANGLES + 2° − 2°
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN WEISSERT DATE 23 APR 63
CHECKED Ed Foster 30 APR 63
APPROVAL 6/24/63
APPROVAL
NASA APPROVAL
MIT APPROVAL 6/26/63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SWITCH ASSEMBLY, ROTARY
(WITH HERMETICALLY
SEALED SWITCH UNITS)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C 1010494
SCALE SHEET 1 OF 2

MASTER

MIL 1077C—F

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010494

REVISIONS			
SYM	DESCRIPTION	DATE	APPD.

DESIGN REQUIREMENTS:

TEMPERATURE RANGE: OPERATING - 0 TO PLUS 160°F.
NON-OPERATING - MINUS 65°F TO PLUS 160°F.

VIBRATION: PER ND 1002055 PARAGRAPH 4.2.9 EXCEPT 15 G'S INPUT. DURING VIBRATION THERE SHALL BE NO TRANSFER OF CONTACTS FROM ONE POSITION TO ANOTHER AND NO MOMENTARY OPENING OR CLOSING OF CONTACTS IN EXCESS OF 10 MICROSECONDS.

SHOCK: PER ND 1002055 PARAGRAPH 4.2.10 EXCEPT 78 G SAWTOOTH, 11 MILLISECOND PULSE DURATION, NON-OPERATING. NO PARTS SHALL BREAK LOOSE FROM THE SWITCH ASSEMBLY AND THE SWITCH ASSEMBLY SHALL BE RETAINED IN ITS MOUNTED POSITION. DEFORMATION OF THE SWITCH ASSEMBLY AND FAILURE TO OPERATE AFTER SHOCK TESTING ARE ALLOWABLE.

LIFE: PER ND 1002055 PARAGRAPH 4.2.14 EXCEPT TEST SHALL CONSIST OF 25,000 SWITCH ACTUATIONS PERFORMED AT AN ACTUATION CYCLING RATE OF 6 ACTUATIONS PER MINUTE. AFTER LIFE TEST THE SWITCH SHALL BE ELECTRICALLY AND MECHANICALLY FUNCTIONAL AND CONTACT RESISTANCE SHALL BE WITHIN THE LIMITS SPECIFIED IN PARAGRAPH 4.2.6.2.

AMBIENT PRESSURE RANGE: SEA LEVEL TO 10^{-4} MM HG ABSOLUTE.

HIGH ALTITUDE OPERATION: SWITCHES SHALL BE CAPABLE OF OPERATION AT AN AMBIENT PRESSURE OF 10^{-4} MM HG ABSOLUTE FOR 4 DAYS.

OXYGEN ATMOSPHERE: SWITCH ASSEMBLY SHALL BE CAPABLE OF OPERATION IN AN AMBIENT ATMOSPHERE OF 100% OXYGEN AT PRESSURES VARYING FROM 10^{-4} MM HG ABSOLUTE TO 15 PSIA WITHOUT CAUSING EXPLOSION OR TOXIC OR CORROSIVE OUTGASSING.

MATERIALS SHALL NOT EXHIBIT TOXIC OR CORROSIVE OUTGASSING UNDER ANY OF THE ENVIRONMENTAL CONDITIONS.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 01791 **DATE** 6/26/63

CONTACT RATINGS

VOLTAGE	AMP.	LOADS
28 DC	3	INDUCTIVE
	5	RESISTIVE

APPLICATION DATA:

ALL VIEWS, INCLUDING SHAFT DETAIL, ARE SHOWN WITH THE SHAFT IN POSITION ONE AGAINST THE COUNTER CLOCKWISE STOP, WHEN VIEWING THE SWITCH ASSEMBLY FROM THE KNOB END WITH THE MOUNTING HOLES ON THE HORIZONTAL CENTERLINE.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

NASA PART NUMBER	NO. POSITIONS	NO. POLES	SWITCH DECKS ACTUATED (C TO ND)		
			POSIT. 1	POSIT. 2	POSIT. 3
1010494 -1	3	12	I	B	A
			J	E	C
				G	D
				H	F
				L	K

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + - DECIMALS + — - — ANGLES + — - — DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. DWG. NO. CONTRACT DRAWN WEISSERT DATE 28 APR 63 CHECKED Ed Foster 30 APR 63 APPROVAL APPROVAL	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
APPLICATION		MATERIAL — CONTRACT	NASA APPROVAL Jack Barnard MIT APPROVAL D. Hoag 6/26/63	SWITCH ASSEMBLY, ROTARY (WITH HERMETICALLY SEALED SWITCH UNITS) SPECIFICATION CONTROL DRAWING	
				CODE IDENT NO. SCALE NONE	SIZE C 1010494 SHEET 2 OF 2

MIL 10776-P

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

4 3 2 1

A	1010496

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
A	REPLACED BY REV B WITH CHANGES PER TDRR 02733	8/21/63	

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 01546 DATE 12 June 1963

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA DOCUMENT ND 1015404, CLASS 2.

C. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002052.

D. MARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-130 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, IDENTIFYING NUMBER, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

E. CONTACTS PER 1010464, TO BE SUPPLIED LOOSE WITH CONNECTOR.

2. ACCEPTANCE AND INSPECTION:

A. DIMENSIONS PER DRAWING.

3. DESIGN REQUIREMENTS:

A. MECHANICAL PROPERTIES:

(1) MATERIAL: BODY - DIALLYL PHTHALATE PER MIL-M-19833, TYPE SDI-5 OR GDI-30 AS APPLICABLE.

CONTACTS-1/2 HARD BRASS GOLD PLATED PER MIL-G-45204, TYPE 2, CLASS 1.

HARDWARE - ALIGNMENT AND MOUNTING HARDWARE SHALL BE NON MAGNETIC CORROSION RESISTANT STEEL, PASSIVATED.

B. ELECTRICAL CHARACTERISTICS:

(1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 160°F MEASURED BETWEEN TWO CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY CONTACT.

(2) DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 1500 VRMS. 90,000 TO 130,000 FT - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 250 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT.

(3) CONTACT MATERIAL RESISTANCE: 0.003 OHMS, MAXIMUM.

A	A
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

Ⓐ REPLACED BY REV B WITH CHANGES

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTES

HEAT TREATMENT
NONE

FINAL FINISH
NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kane DATE 31 May 63
CHECKED A. Maats 6-11-63
APPROVAL 6/11/63
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010496
SCALE NONE	WT	SHEET 1 OF 2

4 3 2 1

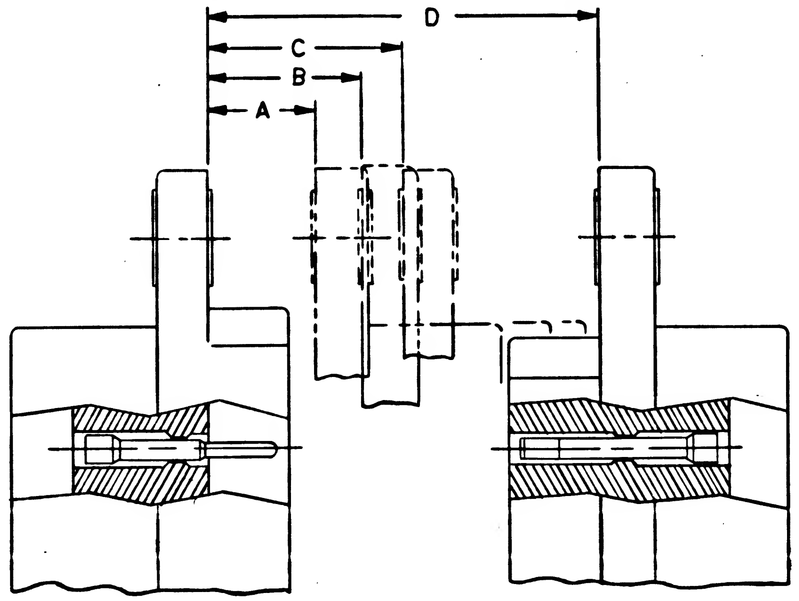
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010496 A

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REPLACED BY REV B WITH CHANGES PER TDRR 02733	8/21/67	

	JACKSCREW	RACK & PANEL HARDWARE
A (FULLY ENGAGED)	.220	.220
B (PIN DISENGAGED)	.350	.350
C (HEX DISENGAGED)	.390	.390
D (FULLY DISENGAGED)	1.020	1.020



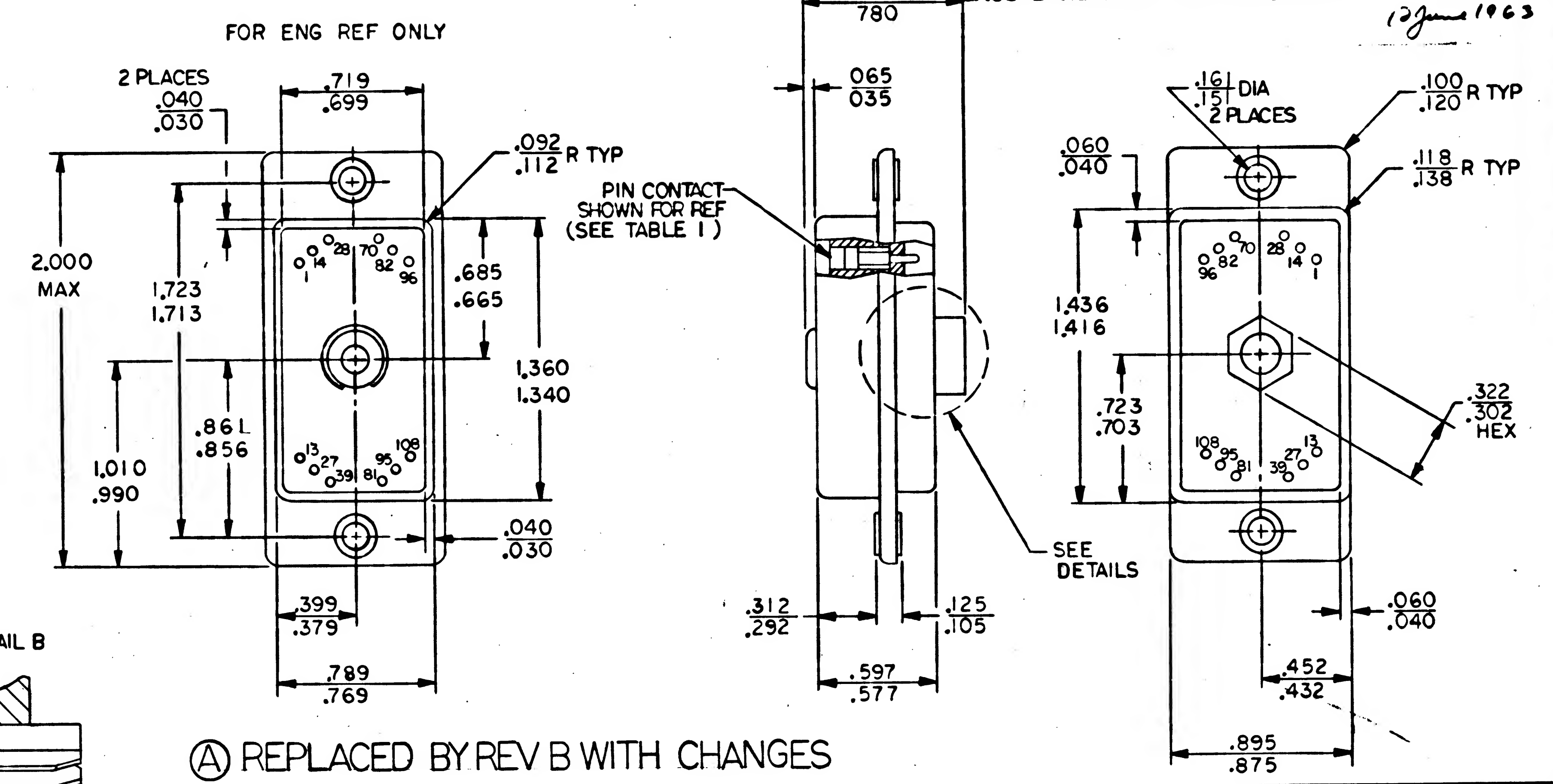
FOR ENG REF ONLY

TABLE I

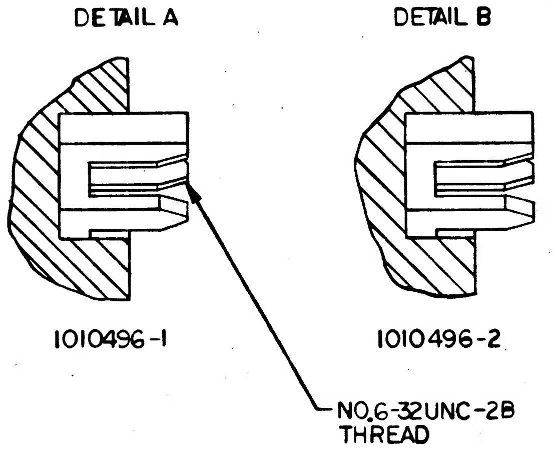
DASH NUMBER	DETAIL	CONTACT TYPE
1010496-1	A	PIN PER 1010464-1
1010496-2	B	PIN PER 1010464-1

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 01546 DATE 12 June 1963



Ⓐ REPLACED BY REV B WITH CHANGES



MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 31 May 63
CHECKED G. Matz 6-11-63
APPROVAL G.W. Mayo 6/4/63
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL R. K. Bryant

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010496
SCALE NONE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

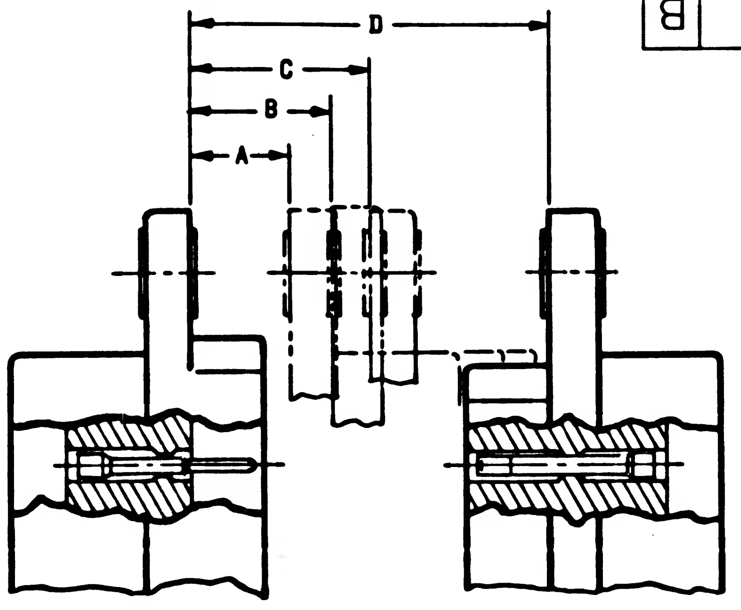
1010496 | B

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02733	8/21/63	

	JACKSCREW	RACK & PANEL HARDWARE
A (FULLY ENGAGED)	.220	.220
B (PIN DISENGAGED)	.350	.350
C (HEX DISENGAGED)	.490	.490
D (FULLY DISENGAGED)	1.020	.780

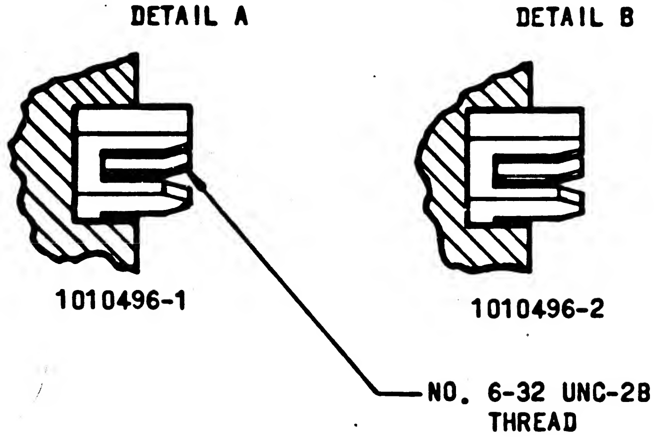
TABLE 1

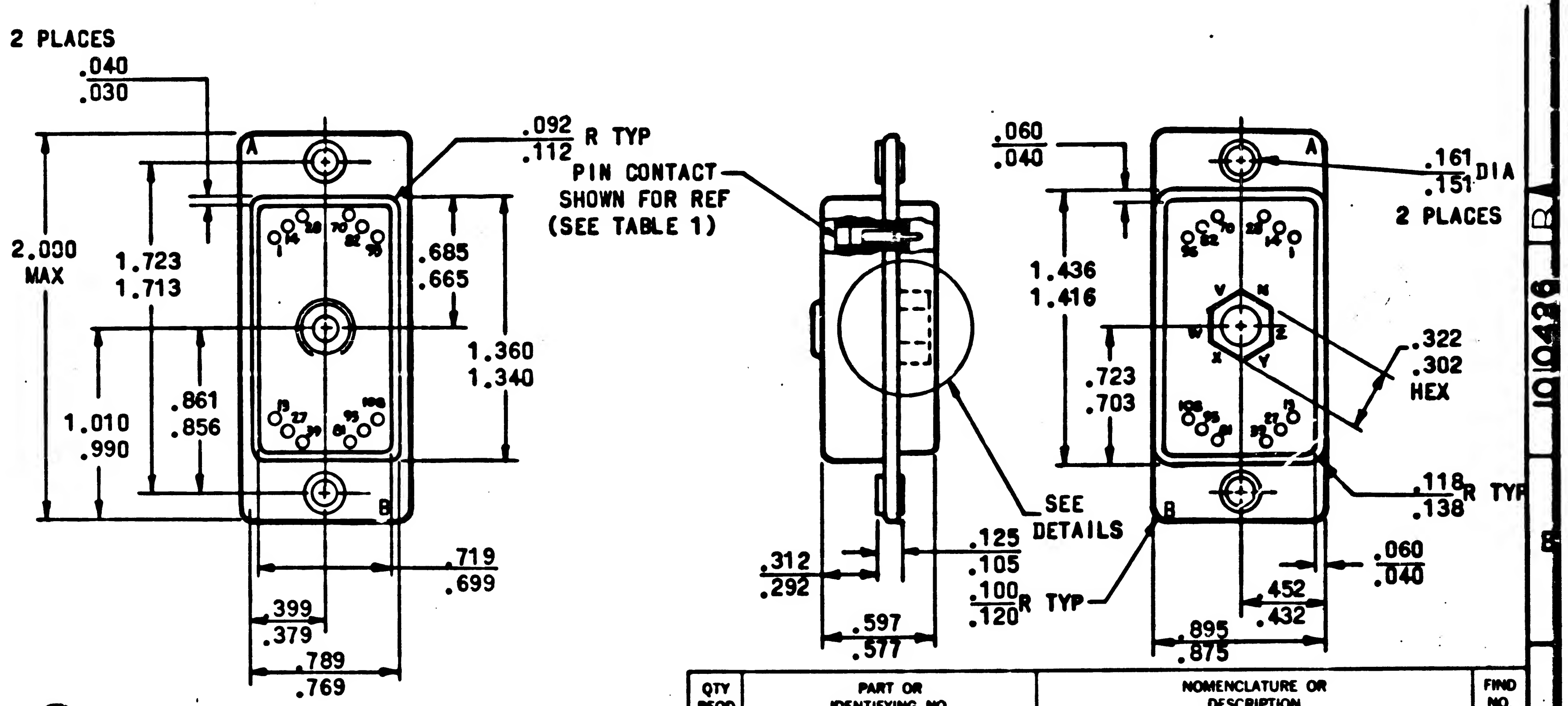
DASH NUMBER	DETAIL	CONTACT TYPE
101496-1	A	PIN PER 1010464-1
1010496-2	B	PIN PER 1010464-1



FOR ENG REF ONLY

B	B
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	





Ⓑ REPLACES REV(A)WITH CHANGE

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NAS9-497
DRAWN Splane DATE 24 JULY 63
CHECKED Wilson 25 JUL 63
APPROVAL E A Woodin 8-21-63
APPROVAL
NASA APPROVAL W. S. 8/21/63
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1010496
SCALE NONE | WT | SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02733	8/2/6	

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002052.

MARKING: UNITS SHALL BE MARKED PERMANENTLY AND LEGIBLY IN ACCORDANCE WITH MIL-STD-130 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL. IDENTIFYING NUMBER, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

CONTACTS PER 1010464. TO BE SUPPLIED WITH CONNECTOR BULK PACKAGED IN A PLIOFILM BAG.

ACCEPTANCE AND INSPECTION:

DIMENSIONS PER DRAWING.

DESIGN REQUIREMENTS:

MECHANICAL PROPERTIES:

MATERIAL: BODY-DIALLYL PHTHALATE PER MIL-M-19833, TYPE SDE-5 OR GDI-30F AS APPLICABLE

CONTACTS: FULL HARD, BRASS, AMERICAN BRASS ALLOY NO. 126 OR NO. 129, GOLD PLATED PER MIL-G-45204, TYPE II, CLASS 1.

HARDWARE:

POLARIZING BOSS: ALUMINUM ALLOY GRADE 7075 T6 PER SPECIFICATION QQ-A-277-1 GRAY ANODIZE PER SPECIFICATION MIL-A-8625 TYPE I.

ELECTRICAL CHARACTERISTICS:

INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 160°F MEASURED BETWEEN TWO CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY CONTACT.

DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 1500 VRMS. 90,000 TO 130,000 FT. - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 250 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT.

CONTACT RESISTANCE: 0.003 OHMS. MAXIMUM.

VOLTAGE RATINGS: (CONTACTS INSTALLED)

	VOLTS DC	VOLTS AC RMS
SEA LEVEL	490	350
10,000 FEET	390	280
60,000 FEET	140	100

WITHSTANDING VOLTAGE (SEA LEVEL) 1500 VOLTS 60 CPS RMS WITHOUT FLASHOVER.

MASTER

Ⓑ REPLACES REV(A)WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS9-497
DRAWN Splane DATE 24 JULY 63
CHECKED Wilson 25 JUL 63
EA Woodin 8-21-63
APPROVAL
NASA APPROVAL 8/21/63
MIT APPROVAL 8/2/6

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010496
SCALE
WT
SHEET 2 OF 2

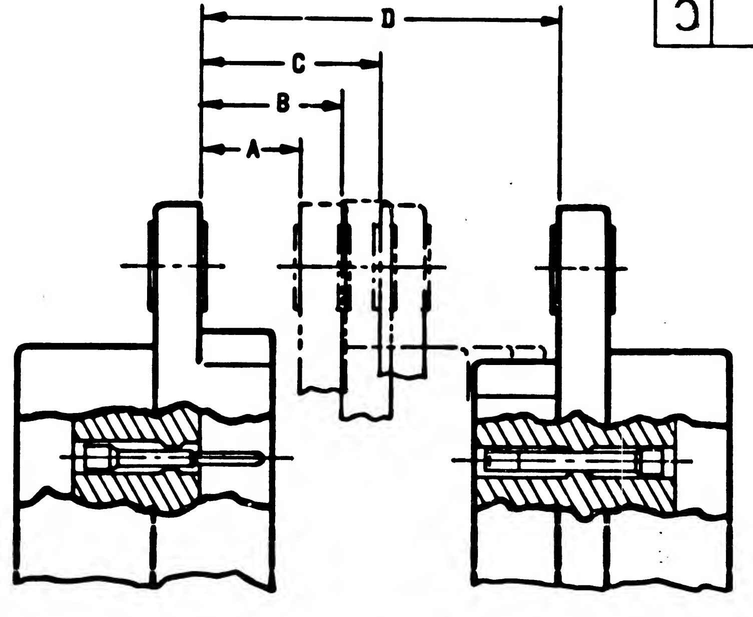
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

C 1010496

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02733	8/21/63	
C	REVISED PER TDRR 06535	7/28/64	EPK WK

	JACKSCREW	RACK & PANEL HARDWARE
A (FULLY ENGAGED)	.220	.220
B (PIN DISENGAGED)	.350	.350
C (HEX DISENGAGED)	.490	.490
D (FULLY DISENGAGED)	1.020	.780

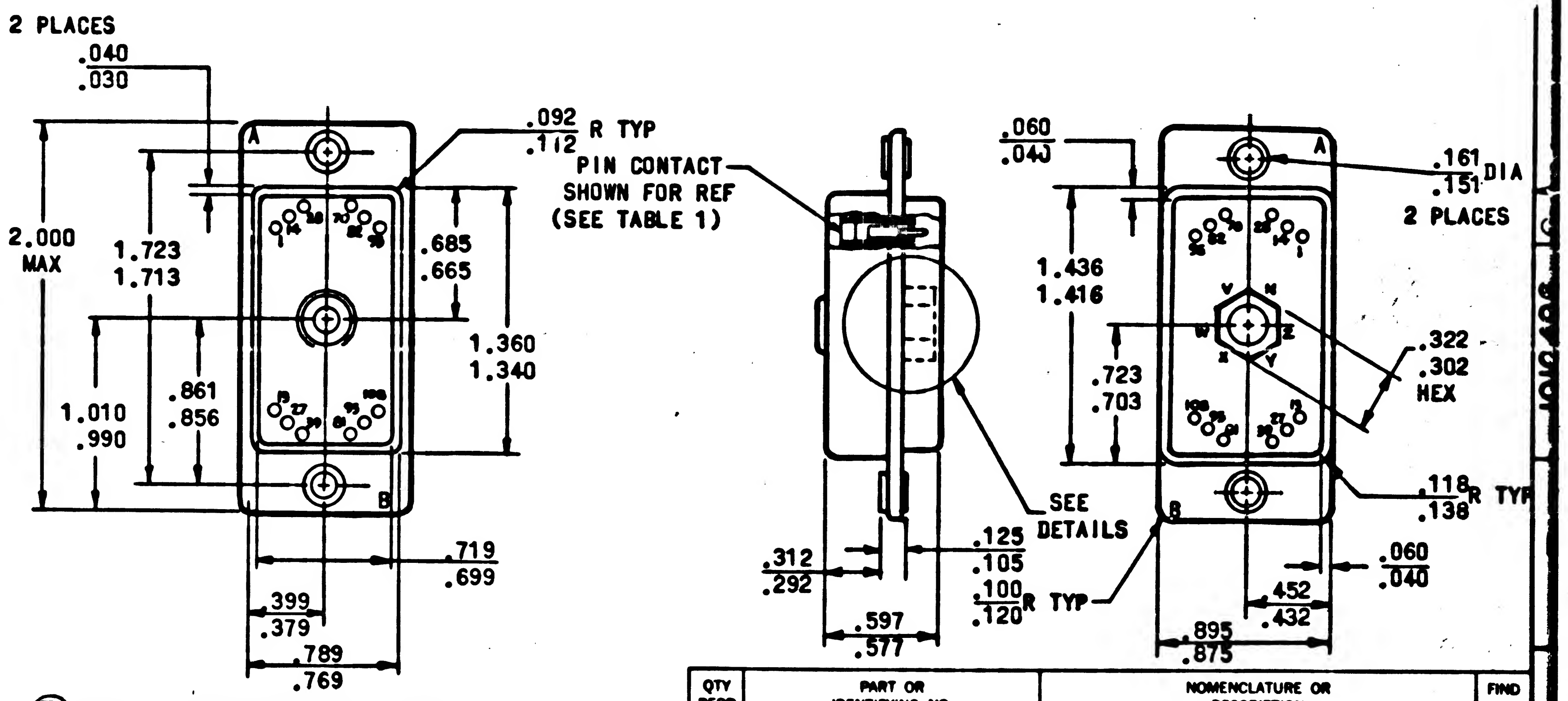


FOR ENG REF ONLY

TABLE 1

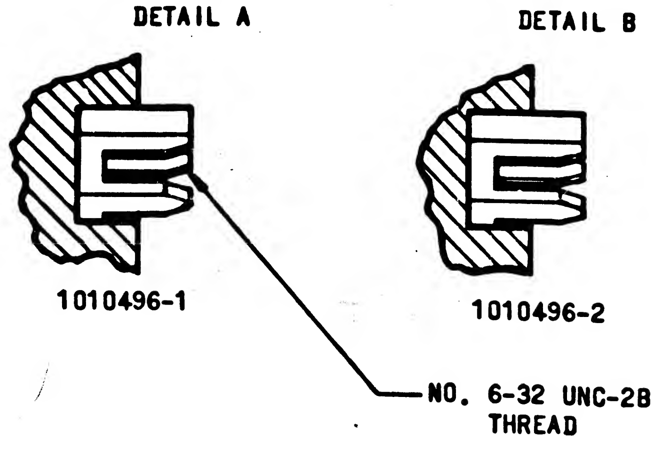
DASH NUMBER	DETAIL	CONTACT TYPE
101496-1	A	PIN PER 1010738-1
1010496-2	B	PIN PER 1010738-1

C	C
B	B
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	



DETAIL A

DETAIL B



1010496-1

1010496-2

Ⓑ REPLACES REV(A)WITH CHANGE

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MATES WITH 1010607

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS9-497
DRAWN Solane DATE 24 JULY 63
CHECKED Wilson 25 JUL 63
APPROVAL E a Woodin 8-21-63
APPROVAL
NASA APPROVAL W. D. 8/21/63
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
108 NO. 22 PIN CONTACTS
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010496
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02733		
C	REVISED PER TDRR 06535	3/28/64	

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002052.
   - D. MARKING: UNITS SHALL BE MARKED PERMANENTLY AND LEGIBLY IN ACCORDANCE WITH ND 1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL. IDENTIFYING NUMBER, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

   CONNECTORS ARE DESIGNED TO USE PIN CONTACTS PER 1010738-1

2. ACCEPTANCE AND INSPECTION:
   - A. DIMENSIONS PER DRAWING.

3. DESIGN REQUIREMENTS:
   - A. MECHANICAL PROPERTIES:
     - (1) MATERIAL: BODY-DIALLYL PHTHALATE PER MIL-M-19833, TYPE SDE-5 OR GDI-30F AS APPLICABLE
     - (2) HARDWARE:

       POLARIZING BOSS: ALUMINUM ALLOY GRADE 7075 T6 PER SPECIFICATION QQ-A-277-1 GRAY ANODIZE PER SPECIFICATION MIL-A-8625 TYPE I.

4. ELECTRICAL CHARACTERISTICS:
   - INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 160°F MEASURED BETWEEN TWO CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY CONTACT.

5. DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 1500 VRMS. 90,000 TO 130,000 FT. - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 250 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT.

6. VOLTAGE RATINGS: (CONTACTS INSTALLED)

	VOLTS DC	VOLTS AC RMS
SEA LEVEL	490	350
10,000 FEET	390	280
60,000 FEET	140	100

WITHSTANDING VOLTAGE (SEA LEVEL) 1500 VOLTS 60 CPS RMS WITHOUT FLASHOVER.

MASTER

Ⓑ REPLACES REV (A) WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS9-497
DRAWN Splane DATE 24 JULY 63
CHECKED Wilson 25 Jul 63
EA Woodin 8-21-63
APPROVAL
NASA APPROVAL 8/21/63
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
108 NO. 22 PIN CONTACTS
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010496
SCALE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

4 3 2 1

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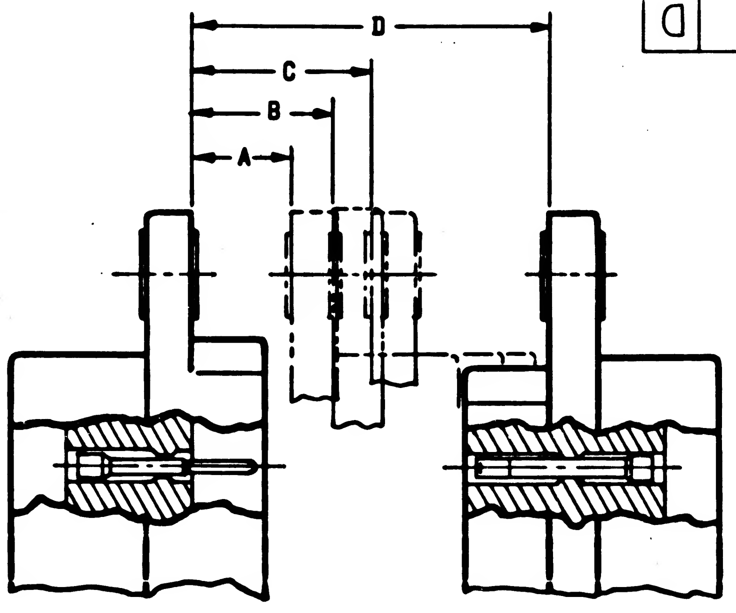
1010496 D

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02733	8/21/63	
C	REVISED PER TDRR 06535	7/28/64	EPK WR
D	REVISED PER TDRR 11945	9/1/64	WR

	JACKSCREW	RACK & PANEL HARDWARE
A (FULLY ENGAGED)	.220	.220
B (PIN DISENGAGED)	.350	.350
C (HEX DISENGAGED)	.490	.490
D (FULLY DISENGAGED)	1.020	.780

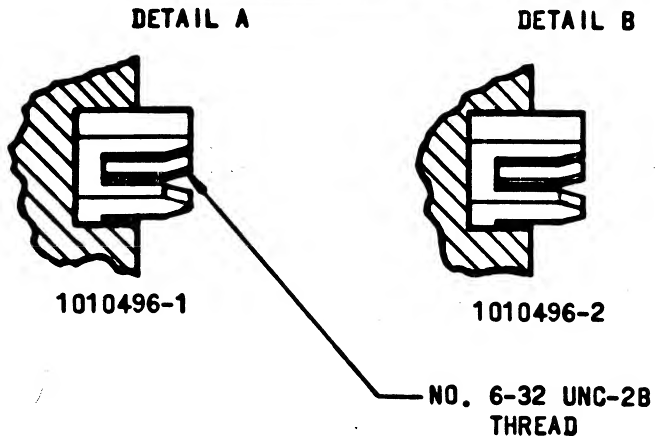


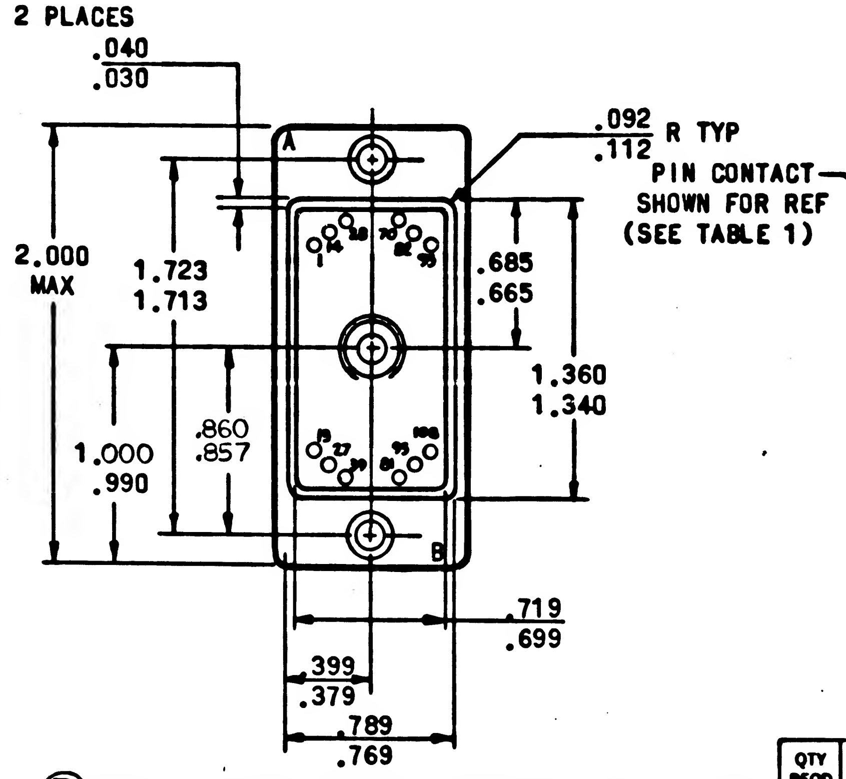
FOR ENG REF ONLY

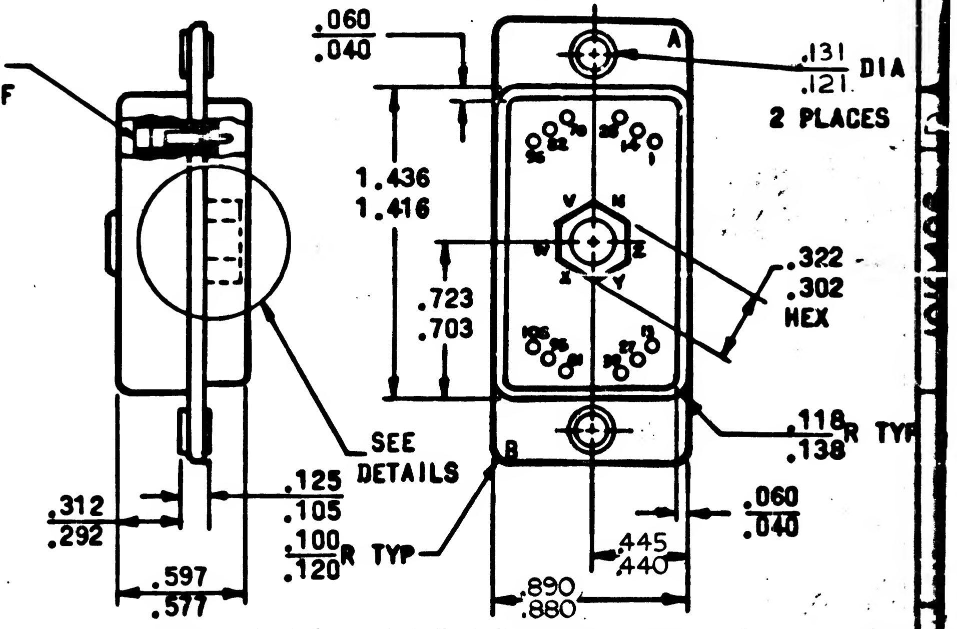
TABLE 1

DASH NUMBER	DETAIL	CONTACT TYPE
101496-1	A	PIN PER 1010738-1
1010496-2	B	PIN PER 1010738-1

D	D
C	C
B	B
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	







Ⓑ REPLACES REV(A) WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MATES WITH 1010607

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
MASS.
DWG. NO.
CONTRACT NAS9-497
DRAWN Solane DATE 24 JULY 63
CHECKED WILSON 25 JUL 63
APPROVAL E A Woodin 8-21-63
APPROVAL
NASA APPROVAL W. S. 8/21/63
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
108 NO. 22 PIN CONTACTS
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010496
SCALE NONE
WT
SHEET 1 OF 2

4 3 2 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010496 D

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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02733		
C	REVISED PER TDRR 06535	3/28/64	WK
D	REVISED PER TDRR 11945	9/1/64	wk

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002052.
   - D. MARKING: UNITS SHALL BE MARKED PERMANENTLY AND LEGIBLY IN ACCORDANCE WITH ND 1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL. IDENTIFYING NUMBER, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.
   - CONNECTORS ARE DESIGNED TO USE PIN CONTACTS PER 1010738-1

2. ACCEPTANCE AND INSPECTION:
   - A. DIMENSIONS PER DRAWING.

3. DESIGN REQUIREMENTS:
   - A. MECHANICAL PROPERTIES:
     - (1) MATERIAL: BODY-DIALLYL PHTHALATE PER MIL-M-19833, TYPE SDE-5 OR GDI-30F AS APPLICABLE
     - (2) HARDWARE: POLARIZING BOSS: ALUMINUM ALLOY GRADE 7075 T6 PER SPECIFICATION QQ-A-277-1 GRAY ANODIZE PER SPECIFICATION MIL-A-8625 TYPE I.

4. ELECTRICAL CHARACTERISTICS:
   - INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 160°F MEASURED BETWEEN TWO CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY CONTACT.

5. DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 1500 VRMS. 90,000 TO 130,000 FT. - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 250 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT.

6. VOLTAGE RATINGS: (CONTACTS INSTALLED)

	VOLTS DC	VOLTS AC RMS
SEA LEVEL	490	350
10,000 FEET	390	280
60,000 FEET	140	100

WITHSTANDING VOLTAGE (SEA LEVEL) 1500 VOLTS 60 CPS RMS WITHOUT FLASHOVER.

MASTER

Ⓑ REPLACES REV(A)WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

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MATERIAL
HEAT TREATMENT
FINAL FINISH

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CAMBRIDGE, MASS
DWG. NO
CONTRACT NAS9-497
DRAWN Splane DATE 24 JULY 63
CHECKED Wilson 25 JUL 63
E A Woodin 8-21-63
APPROVAL
NASA APPROVAL 8/21/63
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
108 NO. 22 PIN CONTACTS
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010496
SCALE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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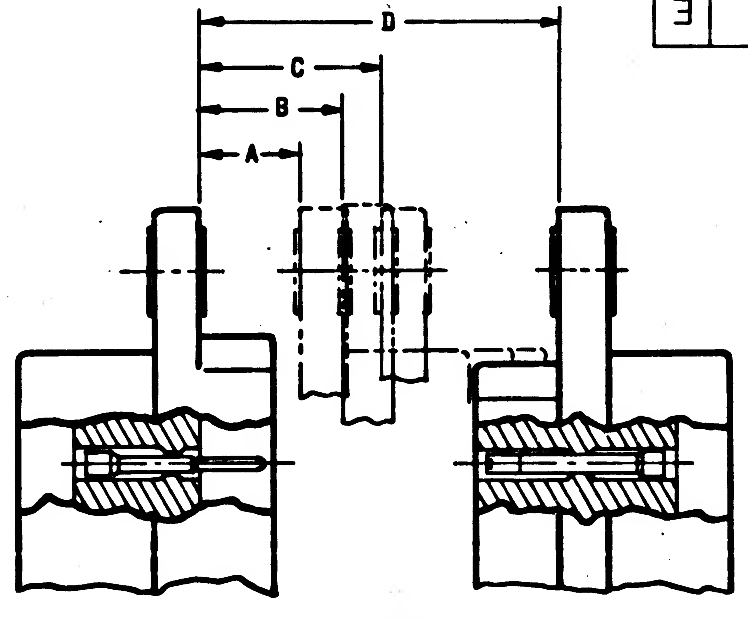
1010496 E

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02733	8/21/63	
C	REVISED PER TDRR 06535	7/28/64	WR
D	REVISED PER TDRR 11945	9/1/64	WR
E	REPLACED BY REV F WITH CHANGES PER TDRR 12494	9-8-64	WR

	JACKSCREW	RACK & PANEL HARDWARE
A (FULLY ENGAGED)	.220	.220
B (PIN DISENGAGED)	.350	.350
C (HEX DISENGAGED)	.490	.490
D (FULLY DISENGAGED)	1.020	.780



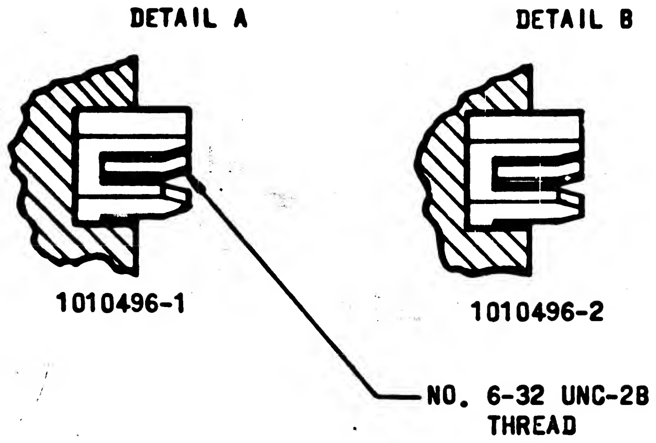
FOR ENG REF ONLY

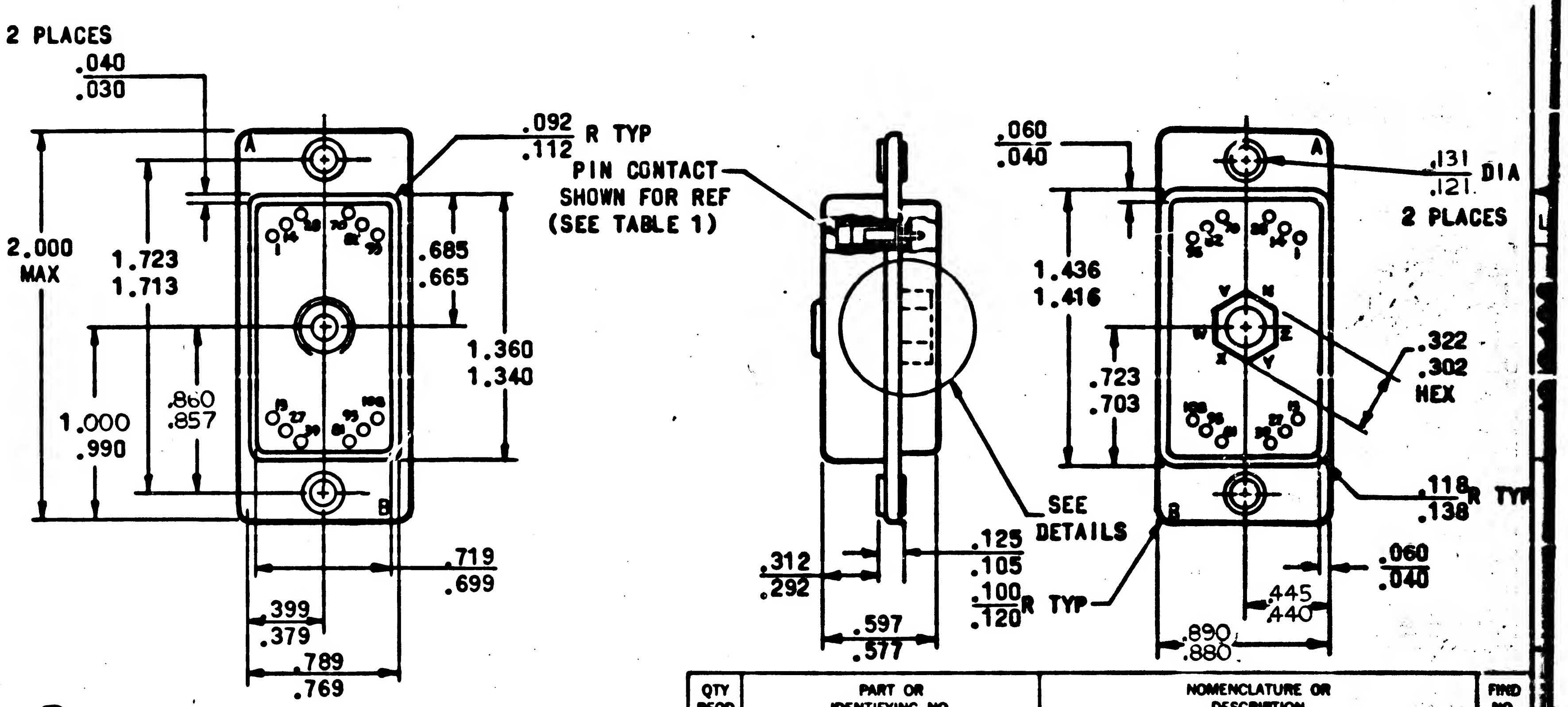
Ⓔ REPLACED BY REV Ⓕ WITH CHANGE

TABLE 1

DASH NUMBER	DETAIL	CONTACT TYPE
101496-1	A	PIN PER 1010738-1
1010496-2	B	PIN PER 1010738-1

D	D
C	C
B	B
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	





Ⓑ REPLACES REV(A)WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MATES WITH 1010607

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS9-497
DRAWN Splane DATE 24 JULY 63
CHECKED Wilson 25 JUL 63
APPROVAL E a Woodin 8-21-63
APPROVAL
NASA APPROVAL 8/21/63
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
108 NO. 22 PIN CONTACTS
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010496
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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E 1010496

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02733		
C	REVISED PER TDRR 06535	3/28/64	WK
D	REVISED PER TDRR 11945	9/1/64	WK
E	REPLACED BY REV F WITH CHANGES PER TDRR 12494	9-8-64	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002052.
   - D. MARKING: UNITS SHALL BE MARKED PERMANENTLY AND LEGIBLY IN ACCORDANCE WITH ND 1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL. IDENTIFYING NUMBER, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.
   - CONNECTORS ARE DESIGNED TO USE PIN CONTACTS PER 1010738-1

2. ACCEPTANCE AND INSPECTION:
   - A. DIMENSIONS PER DRAWING.

3. DESIGN REQUIREMENTS:
   - A. MECHANICAL PROPERTIES:
     - (1) MATERIAL: BODY-DIALLYL PHTHALATE PER MIL-M-19833, TYPE SDE-5 OR GDI-30F AS APPLICABLE
     - (2) HARDWARE:
       POLARIZING BOSS: ALUMINUM ALLOY GRADE 7075 T6 PER SPECIFICATION QQ-A-277-1 GRAY ANODIZE PER SPECIFICATION MIL-A-8625 TYPE I.

4. ELECTRICAL CHARACTERISTICS:
   - INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 160°F MEASURED BETWEEN TWO CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY CONTACT.

5. DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 1500 VRMS. 90,000 TO 130,000 FT. - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 250 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT.

6. VOLTAGE RATINGS: (CONTACTS INSTALLED)

	VOLTS DC	VOLTS AC RMS
SEA LEVEL	490	350
10,000 FEET	390	280
60,000 FEET	140	100

WITHSTANDING VOLTAGE (SEA LEVEL) 1500 VOLTS 60 CPS RMS WITHOUT FLASHOVER.

MASTER

Ⓔ REPLACED BY REV Ⓕ WITH CHANGE

Ⓑ REPLACES REV (A) WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO CONTRACT NAS9-497
DRAWN Splane DATE 24 JULY 63
CHECKED WILSON 25 JUL 63
APPROVAL E A Woodin 8-21-63
APPROVAL
NASA APPROVAL 8/21/63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
106 NO. 22 PIN CONTACTS
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010496
SCALE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010496 F

SYM	DESCRIPTION	DATE	APPROVAL
F	REPLACES REV. E WITH CHANGE PER TDRR 12494	9-8-64	WK

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002052.
   - D. PIN CONTACTS ARE TO BE PROCURED SEPARATELY PER 1010738-1.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL:
       - (a) BODY: DIALLYLPHTHALATE PER MIL-P-19833, TYPE SDI-5 OR GDI-30F AS APPLICABLE (UNPIGMENTED)
       - (b) HARDWARE:
         - POLARIZING BOSS: ALUMINUM ALLOY GRADE 7075T6 PER QQ-A-277-1.
         - SPACER: BRASS PER QQ-B-626, COMPOSITION 11.
         - METAL INSERT: CORROSION RESISTANT STEEL, CLASS 303, OR 303 S_e, CONDITION A OR B PER QQ-S-763.
         - RETAINING RING: MS-16632-28 PER MIL-R-21248.
     - (2) FINISH:
       - (a) HARDWARE:
         - POLARIZING BOSS: GRAY ANODIZE PER MIL-A-8625, CLASS 1
         - METAL INSERT: PASSIVATE PER MIL-F-14072 FINISH NO. E-300.
         - SPACER: NICKEL PLATE PER QQ-N-290.
     - (3) FOR POLARIZATION: NORMAL
     - (4) DIMENSIONS: AS PER DRAWING
     - (5) MARKING:
       - (a) PIECEMARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH ND 1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, MANUFACTURER'S LOT OR SERIAL NUMBER TRACEABLE TO DATE OF MANUFACTURE. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART.
       - (b) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME
         - NASA PART NUMBER AND REVISION LETTER
         - SUPPLIER'S LOT OR SERIAL NUMBER
       - (c) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

Ⓕ REPLACES REV(E) WITH CHANGE

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. Contract NAS 9-497
DRAWN D. Gilbert DATE 27JAN64
CHECKED Ed Foster 29 JAN 64
APPROVAL E A Woodin 9-8-64
APPROVAL
NASA APPROVAL W J Rhine 9-8-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR-PLUG, ELECTRICAL

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010496
SCALE NONE WT SHEET 1 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

4 3 2 1

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1010496 F

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
F	REPLACES REV. E WITH CHANGE PER TDRR 12494	9-8-64	WK

3. DESIGN REQUIREMENTS:

A. ELECTRICAL REQUIREMENTS WITH CONTACTS INSTALLED

1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM (500 VDC) AT 150°F MEASURED BETWEEN ANY TWO ADJACENT CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY ADJACENT CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202 METHOD 302, CONDITION C.

2) DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 600 VRMS. 90,000 TO 130,000 FT. - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 250 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301.

3) VOLTAGE RATINGS:

	VOLTS DC	VOLTS AC RMS
SEA LEVEL	490	350
10,000 FT.	390	280
60,000 FT.	140	100

WITHSTANDING VOLTAGE (SEA LEVEL) 1500 VOLTS RMS 60 CPS WITHOUT FLASHOVER.

B. MECHANICAL:

1) CONTACT RETENTION FORCE

a) WHEN CONTACTS ARE PROPERLY INSTALLED IN THEIR USING CONNECTOR, THEY ARE CAPABLE OF WITHSTANDING (WITHOUT DAMAGE) A MIN OF 15 LBS. AXIAL LOAD APPLIED IN EITHER DIRECTION AFTER NOT LESS THAN 10 INSERTIONS AND WITHDRAWALS.

NOTE 1: SHADED AREAS INDICATE HIGH PORTION OF POLARIZING DEVICE.

LARGE NOTCH IS ADJACENT TO POLARIZATION POSITION LETTER REQUESTED

NOTE 2: DASH 1 AND DASH 2 IDENTICAL IN ALL RESPECTS EXCEPT VENDOR NUMBER.

Ⓕ REPLACES REV(E)WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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DIMENSIONS ARE IN INCHES
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APPROVAL E a Woodin 9-8-64
APPROVAL
NASA APPROVAL W J Rhine 9-8-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR-PLUG, ELECTRICAL

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010496
SCALE
WT
SHEET 2 OF 3

MASTER

4 3 2 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
F	REPLACES REV. E WITH CHANGE PER TDRR 12494	9-8-64	CW

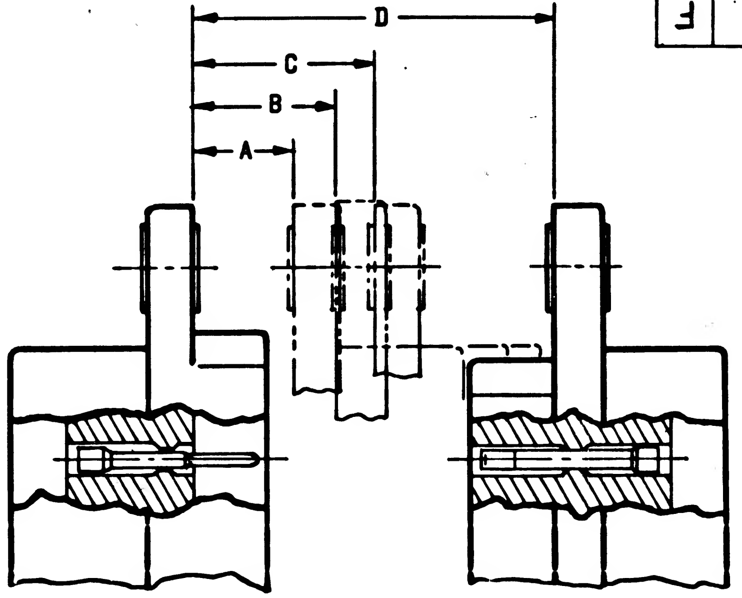
	JACKSCREW	RACK & PANEL HARDWARE
A (FULLY ENGAGED)	.220	.220
B (PIN DISENGAGED)	.350	.350
C (HEX DISENGAGED)	.490	.490
D (FULLY DISENGAGED)	1.180	.780

TABLE 1

DASH NUMBER	APPLICATION
-1	JACKSCREW
-2	RACK AND PANEL

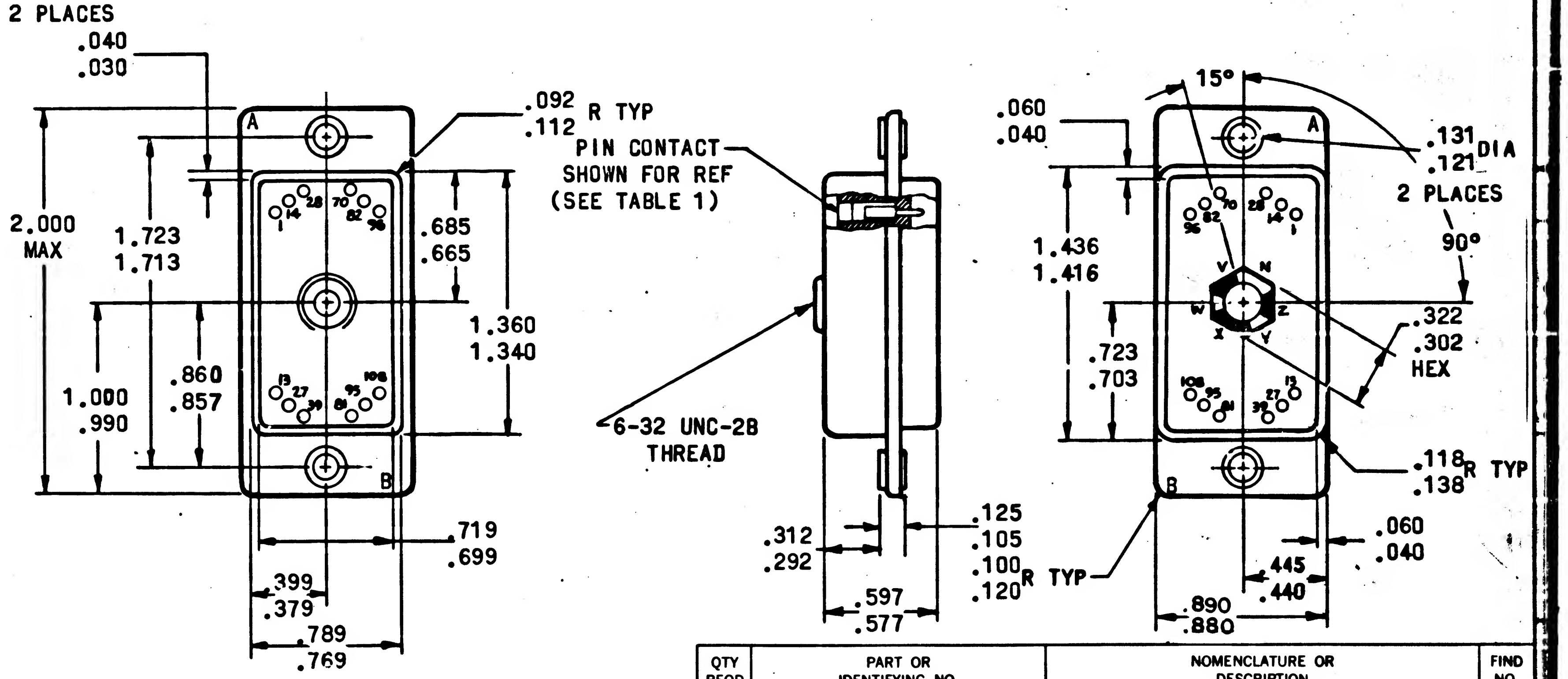
SEE NOTE 2

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.



FOR ENG REF ONLY

Ⓕ REPLACES REV(E)WITH CHANGE



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN D. Dobbert DATE 27 JAN 64
CHECKED Ed Foster 29 JAN 64
APPROVAL E A Woodin 9-8-64
APPROVAL
NASA APPROVAL W J Rh 9-8-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010496
SCALE NONE WT SHEET 3 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010496

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 01546 DATE 12 June 1963

REQUIREMENTS:

1. GENERAL:

   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

   B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA DOCUMENT ND 1015404, CLASS 2.

   C. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002052.

   D. MARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-130 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, IDENTIFYING NUMBER, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

   E. CONTACTS PER 1010464, TO BE SUPPLIED LOOSE WITH CONNECTOR.

2. ACCEPTANCE AND INSPECTION:

   A. DIMENSIONS PER DRAWING.

3. DESIGN REQUIREMENTS:

   A. MECHANICAL PROPERTIES:

      (1) MATERIAL: BODY - DIALLYL PHTHALATE PER MIL-M-19833, TYPE SDI-5 OR GDI-30 AS APPLICABLE.

      CONTACTS-1/2 HARD BRASS GOLD PLATED PER MIL-G-45204, TYPE 2, CLASS 1.

      HARDWARE - ALIGNMENT AND MOUNTING HARDWARE SHALL BE NON MAGNETIC CORROSION RESISTANT STEEL, PASSIVATED.

   B. ELECTRICAL CHARACTERISTICS:

      (1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 160°F MEASURED BETWEEN TWO CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY CONTACT.

      (2) DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 1500 VRMS. 90,000 TO 130,000 FT - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 250 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT.

      (3) CONTACT MATERIAL RESISTANCE: 0.003 OHMS, MAXIMUM.

A	A
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kane DATE 31 May 63
CHECKED A. Marts 6-11-63
APPROVAL 6/11/63
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010496
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
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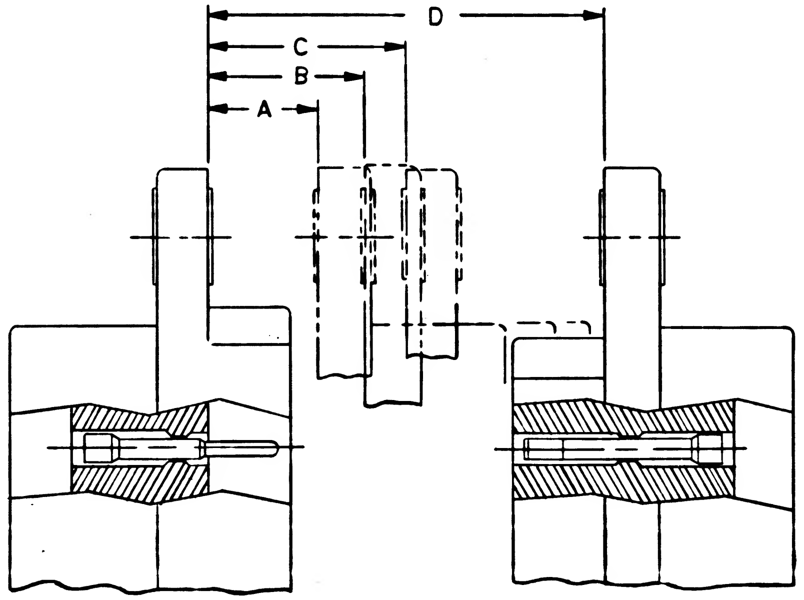
1010496

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL



FOR ENG REF ONLY

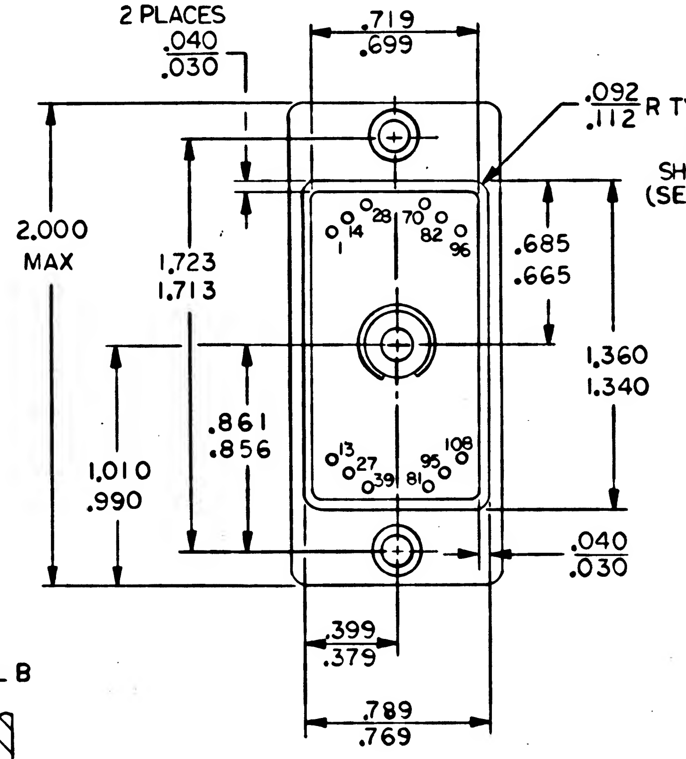
	JACKSCREW	RACK & PANEL HARDWARE
A (FULLY ENGAGED)	.220	.220
B (PIN DISENGAGED)	.350	.350
C (HEX DISENGAGED)	.390	.390
D (FULLY DISENGAGED)	1.020	1.020

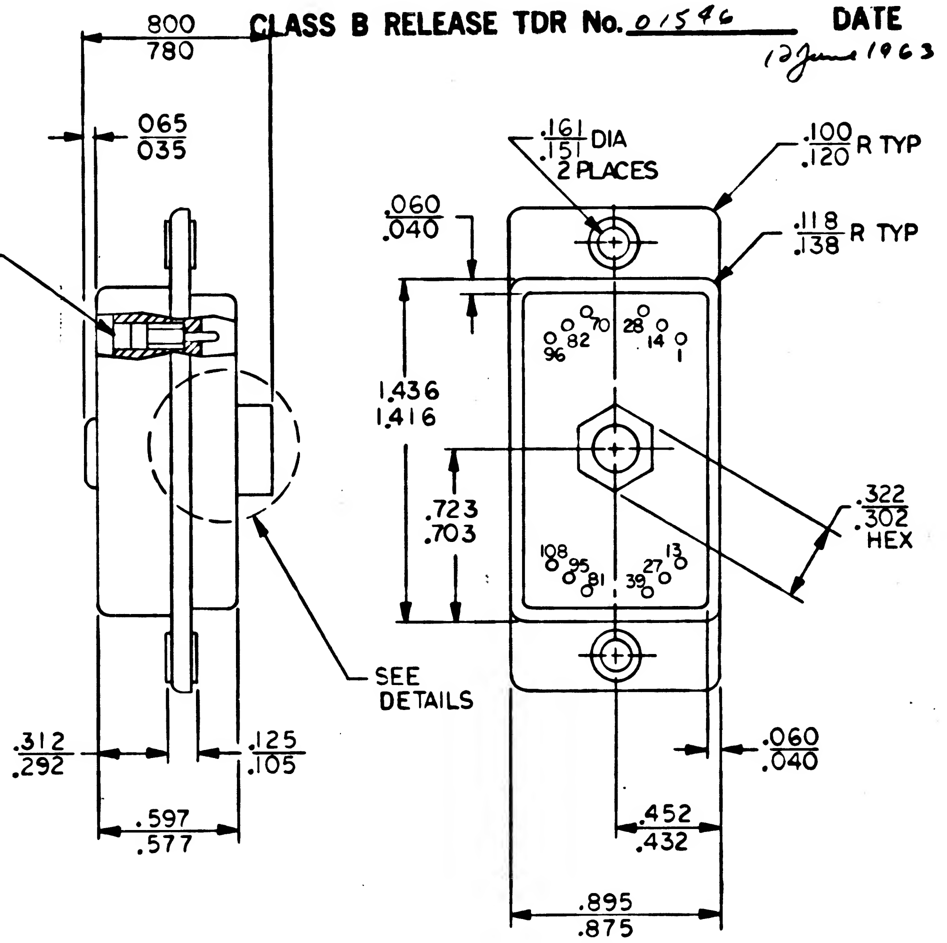
TABLE I

DASH NUMBER	DETAIL	CONTACT TYPE
1010496-1	A	PIN PER 1010464-1
1010496-2	B	PIN PER 1010464-1

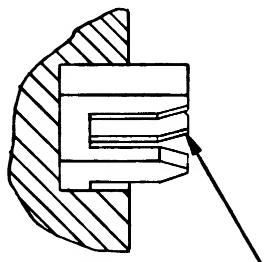
FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 01546 **DATE** 12 June 1963



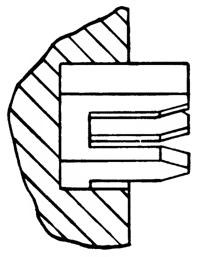


DETAIL A



1010496-1

DETAIL B



1010496-2

NO.6-32UNC-2B THREAD

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 31 May 63
CHECKED G. Matt 6-11-63
APPROVAL G.W. Mayo 6/11/63
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010496
SCALE NONE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02596	14 Aug 63	WR.
A	REVISED PER TDRR 06692		erc WR

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS OF ND 1002054.
   - C. SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PER NASA DOCUMENT 1015404, CLASS 2.
   - D. PACKAGING AND PACKING: UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-P-19491 LEVEL A IN BOTH INSTANCES. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-P-19491 AND SHALL INCLUDE THE NASA DRAWING NUMBER, DASH NUMBER, REVISION LETTER AND LOT CODE. THE MANUFACTURER'S PART NUMBER, NAME, TRADEMARK OR CODE, AND DATE CODE, MAY APPEAR ON THE PACKAGE.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) LEAD DATA: SOLID SILVER LEADS. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
     - (2) MARKING: THE COLOR BANDS IDENTIFYING THE LAST 3 DIGITS OF THE NASA DRAWING NUMBER AND THE DASH NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER PARAGRAPH 3.8.1 OF MIL-S-19500.
   - B. ELECTRICAL REQUIREMENTS: PER TABLE II.
     - (1) FORWARD VOLTAGE (V_F)
     - (2) REVERSE CURRENT (I_R) AT T_A = 100°C
     - (3) BREAKDOWN VOLTAGE (BV)
     - (4) REVERSE RECOVERY TIME (t_{rr})

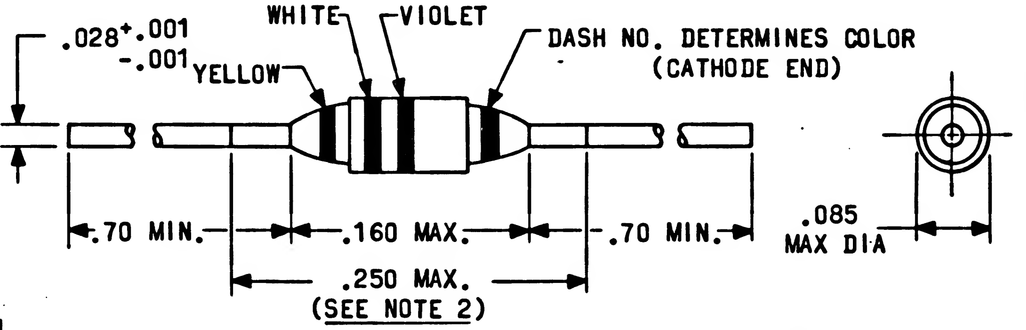
3. DESIGN REQUIREMENTS:
   - A. STORAGE AND OPERATING TEMPERATURE: -65°C TO +175°C
   - B. ELECTRICAL RATING: PER TABLE I
   - C. ELECTRICAL SPECIFICATION: PER TABLE II
   - D. POWER DISSIPATION:
     - (1) AT 25°C AMBIENT TEMPERATURE: 3.4 WATTS MAX
     - (2) AT 100°C AMBIENT TEMPERATURE: 1.7 WATTS MAX
     - (3) AT 150°C AMBIENT TEMPERATURE: .57 WATTS MAX
   - E. THERMAL RESISTANCE: 44°C/W

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
     - (1) AMBIENT TEMPERATURE: $100^{\circ}{}^{+5^{\circ}C}_{-0^{\circ}C}$
   - B. THE DIODE SHALL BE STRESSED BY AN APPROXIMATE SINE WAVE HAVING A FREQUENCY OF 60 ± 6 CYCLES AT 250 PEAK INVERSE VOLTS. THE DIODE SHALL HAVE A RESISTIVE LOAD SUCH THAT THE AVERAGE RECTIFIED CURRENT IS 600 MILLIAMPS.
   - C. DIODES WHICH FAIL TO MEET ALL INITIAL MEASUREMENTS AND THE SPECIFIED LIMITS FOR PARAMETRIC CHANGES FOLLOWING BURN-IN SHALL NOT BE ACCEPTABLE.
   - D. INSPECTION OF SEMICONDUCTORS: PER ND 1002220.

A CERTIFICATE OF COMPLIANCE FOR THESE INSPECTION REQUIREMENTS SHALL BE INCLUDED WITH EACH SHIPMENT.

NOTES:

1. MEASURED WITH A BOONTON ELECTRONIC CORPORATION MODEL NO. 75A-S8 OR EQUIVALENT.
2. MAXIMUM ALLOWABLE AREA WITH PAINT ON DEVICE.



A	A	—
—	—	—
SHEET 1	SHEET 2	SHEET 3

REVISION STATUS OF SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

NEXT ASSY | USED ON
APPLICATION

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TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 .02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS 9-497
DRAWN J.H. Robinson DATE 26 JUL 63
CHECKED Hogue 27 JULY 63
APPROVAL D.B. Hoag 13 AUG 63
APPROVAL
NASA APPROVAL W J Rhine 8-14-63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SEMICONDUCTOR DEVICE, DIODE, SILICON

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1010497
SCALE NONE | WT | SHEET 1 OF 3

INCHES
0 1 2
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1010497 A

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02596	14 Aug 63	WK
A	REVISED PER TDRR 06692		EDK WK

D

E. THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING

(1) ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:

(a) FORWARD VOLTAGE (V_F)

(b) REVERSE CURRENT (I_R)

(2) BURN-IN DATA SHALL BE INCLUDED WITH EACH SHIPMENT.

(3) THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL DIODE WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF THE ABSOLUTE VALUE OF EACH CHARACTERISTIC AND TO SHOW THE FREQUENCY DISTRIBUTION OF THE PERCENT CHANGE OF EACH CHARACTERISTIC FROM ITS INITIAL READING. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR WHICH EXCEED THE SPECIFIED LIMITS FOR PARAMETRIC CHANGES FOLLOWING BURN-IN SHALL NOT BE ACCEPTABLE.

C

F. PARAMETRIC CHANGE LIMITS:

(1) FORWARD VOLTAGE: ± 10% OF INITIAL VALUE.

(2) REVERSE CURRENT: ± 50% OF INITIAL VALUE OR 1 μA WHICHEVER IS GREATER.

TABLE I

MANUFACTURER'S ABSOLUTE MAXIMUM RATING AT AMBIENT TEMPERATURE = 25°C (UNLESS OTHERWISE SPECIFIED)

PEAK INVERSE VOLTAGE (PIV)	RECTIFIED FORWARD CURRENT (I_O)	RECTIFIED FORWARD CURRENT T_A=100°C (I_O)	FORWARD CURRENT STEADY STATE DC (I_F)	RECURRENT PEAK FORWARD CURRENT (I_F)	PEAK FORWARD SURGE CURRENT (I_f) SURGE PULSE WIDTH 8 MILISEC.	1 SEC.	POWER DISSIPATION (P)	
V_{DC}	A_{DC}	A_{DC}	A_{DC}	A_{DC}	A	A	WATTS	
500	2	1.2	2	6	20	4	3.4	

B

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

A

MASTER

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

HEAT TREATMENT

FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS 9-497

DRAWN J.H. [illegible] DATE 26 JUL 63
CHECKED Hogue 27 JULY 63
APPROVAL [illegible] 12 AUG 63
APPROVAL

NASA APPROVAL W.J. [illegible] 8-14-63

MIT APPROVAL 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SEMICONDUCTOR DEVICE, DIODE, SILICON

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010497

SCALE
WT
SHEET 2 OF 3

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0 1 2
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1010497 B

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02594	14 Aug 63	WR.
A	REVISED PER TDRR 06692		WR
B	REVISED PER TDRR 08233	12 May 64	WR

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS OF ND 1002054.
   - C. SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PER NASA DOCUMENT 1015404, CLASS 2.
   - D. PACKAGING AND PACKING: UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-S-19491 LEVEL A IN BOTH INSTANCES. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-STD-129 AND SHALL INCLUDE THE NASA DRAWING NUMBER, DASH NUMBER, REVISION LETTER AND LOT CODE. THE MANUFACTURER'S PART NUMBER, NAME, TRADEMARK OR CODE, AND DATE CODE, MAY APPEAR ON THE PACKAGE.

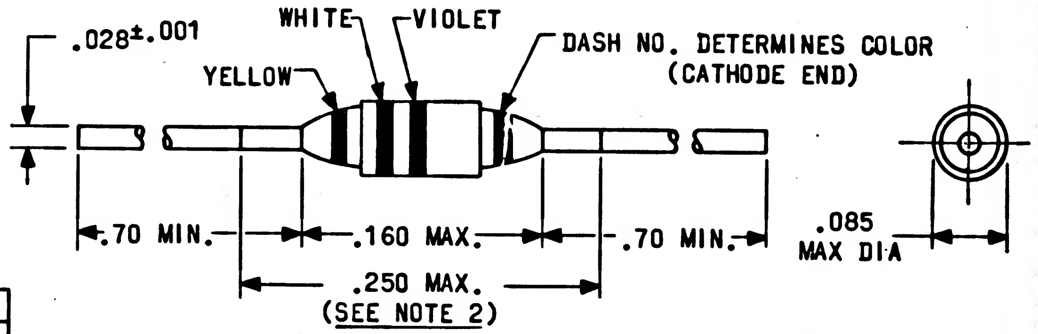
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) LEAD DATA: SOLID SILVER LEADS. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
     - (2) MARKING: THE COLOR BANDS IDENTIFYING THE LAST 3 DIGITS OF THE NASA DRAWING NUMBER AND THE DASH NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER PARAGRAPH 3.8.1 OF MIL-S-19500.
   - B. ELECTRICAL REQUIREMENTS: PER TABLE II.
     - (1) FORWARD VOLTAGE (V_F)
     - (2) REVERSE CURRENT (I_R) AT T_A = 100°C
     - (3) BREAKDOWN VOLTAGE (BV)
     - (4) REVERSE RECOVERY TIME (t_{rr})

3. DESIGN REQUIREMENTS:
   - A. STORAGE AND OPERATING TEMPERATURE: -65°C TO +175°C
   - B. ELECTRICAL RATING: PER TABLE I
   - C. ELECTRICAL SPECIFICATION: PER TABLE II
   - D. POWER DISSIPATION:
     - (1) AT 25°C AMBIENT TEMPERATURE: 3.4 WATTS MAX
     - (2) AT 100°C AMBIENT TEMPERATURE: 1.7 WATTS MAX
     - (3) AT 150°C AMBIENT TEMPERATURE: .57 WATTS MAX
   - E. THERMAL RESISTANCE: 44°C/W

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
     - (1) AMBIENT TEMPERATURE: $100^{\circ}{}^{+5^{\circ}C}_{-0^{\circ}C}$
   - B. THE DIODE SHALL BE STRESSED BY AN APPROXIMATE SINE WAVE HAVING A FREQUENCY OF 60 ± 6 CYCLES AT 250 PEAK INVERSE VOLTS. THE DIODE SHALL HAVE A RESISTIVE LOAD SUCH THAT THE AVERAGE RECTIFIED CURRENT IS 600 MILLIAMPS.
   - C. DIODES WHICH FAIL TO MEET ALL INITIAL MEASUREMENTS AND THE SPECIFIED LIMITS FOR PARAMETRIC CHANGES FOLLOWING BURN-IN SHALL NOT BE ACCEPTABLE.
   - D. INSPECTION OF SEMICONDUCTORS: PER ND 1002220.

A CERTIFICATE OF COMPLIANCE FOR THESE INSPECTION REQUIREMENTS SHALL BE INCLUDED WITH EACH SHIPMENT.

NOTES:
1. MEASURED WITH A BOONTON ELECTRONIC CORPORATION MODEL NO. 75A-S8 OR EQUIVALENT.
2. MAXIMUM ALLOWABLE AREA WITH PAINT ON DEVICE.



B	A	B
A	A	—
—	—	—
SHEET 1	SHEET 2	SHEET 3
REVISION STATUS OF SHEETS		

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

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MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.005 .02 ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
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CONTRACT NAS 9-497
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CHECKED Hogue 27 JULY 63
APPROVAL D.B. [illegible] 13 AUG 63
APPROVAL
NASA APPROVAL W J Rhine 8-14-63
MIT APPROVAL W [illegible] 14 Aug 63

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SEMICONDUCTOR DEVICE, DIODE, SILICON

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010497
SCALE NONE
WT
SHEET 1 OF 3

INCHES
0 1 2
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REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02596	14 Aug 63	WK
B	REVISED PER TDRR 08233	12 May 64	WK

TABLE II

ELECTRICAL CHARACTERISTICS AT AMBIENT TEMPERATURE = 25°C (UNLESS OTHERWISE SPECIFIED)

PARAMETER	CONDITIONS	SYMBOL	SPECIFICATION LIMITS		
			MIN	MAX	UNITS
FORWARD VOLTAGE	I_F = 750 MA	V_F		1.2	VOLT
BREAKDOWN VOLTAGE	I_R = 100 μA	B_V	550		VOLTS
REVERSE CURRENT	V_R = -500V,	I_R		10.0	uA
	V_R = -500V, T_A = 100°C	I_R		125	uA
	V_R = -500V, T_A = 150°C	I_R		300	uA
REVERSE RECOVERY TIME	I_F = 5 MA FORWARD TO I_R = 1 MA REVERSE MEASURED WITH TEKTRONIX 543-TYPE S PLUG IN OR EQUIVALENT	t_{rr}		1.0	μ SEC

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
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SIZE C
NASA DRAWING NO 1010497
SCALE
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SHEET 3 OF 3

INCHES
0 1 2
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–	1010497

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02596	14 Aug 63	WR.

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS OF ND 1002054.

SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PER NASA DOCUMENT 1015404, CLASS 2.

PACKAGING AND PACKING: UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-P-19491 LEVEL A IN BOTH INSTANCES. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-P-19491 AND SHALL INCLUDE THE NASA DRAWING NUMBER, DASH NUMBER, REVISION LETTER AND LOT CODE. THE MANUFACTURER'S PART NUMBER, NAME, TRADEMARK OR CODE, AND DATE CODE, MAY APPEAR ON THE PACKAGE.

INSPECTION AND ACCEPTANCE:

MECHANICAL REQUIREMENTS:

LEAD DATA: SOLID SILVER LEADS. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.

MARKING: THE COLOR BANDS IDENTIFYING THE LAST 3 DIGITS OF THE NASA DRAWING NUMBER AND THE DASH NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER PARAGRAPH 3.8.1 OF MIL-S-19500.

ELECTRICAL REQUIREMENTS: PER TABLE II.

FORWARD VOLTAGE (V_F)
REVERSE CURRENT (I_R) AT T_A = 100°C
BREAKDOWN VOLTAGE (BV)
REVERSE RECOVERY TIME (t_{rr})

DESIGN REQUIREMENTS:

STORAGE AND OPERATING TEMPERATURE: -65°C TO +175°C
ELECTRICAL RATING: PER TABLE I
ELECTRICAL SPECIFICATION: PER TABLE II
POWER DISSIPATION:
AT 25°C AMBIENT TEMPERATURE: 3.4 WATTS MAX
AT 100°C AMBIENT TEMPERATURE: 1.7 WATTS MAX
AT 150°C AMBIENT TEMPERATURE: .57 WATTS MAX
THERMAL RESISTANCE: 44°C/W

SPECIAL CONDITIONING BY SUPPLIER:

BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:

AMBIENT TEMPERATURE: $100^{\circ}{}^{+5^{\circ}C}_{-0^{\circ}C}$

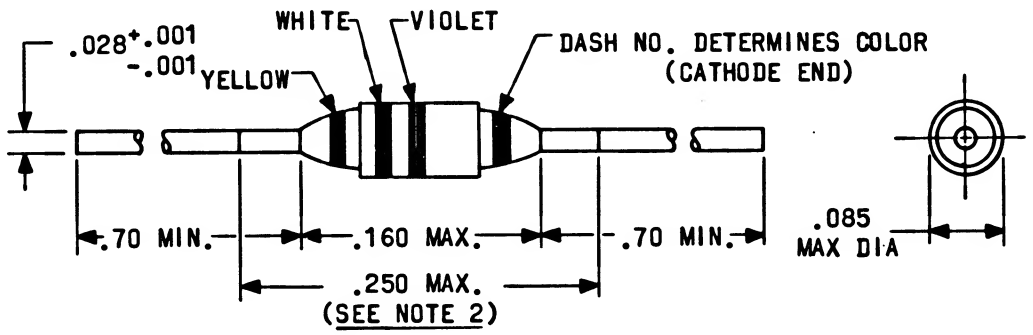
PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

THE DIODE SHALL BE STRESSED BY AN APPROXIMATE SINE WAVE HAVING A FREQUENCY OF 60 ± 6 CYCLES AT 250 PEAK INVERSE VOLTS. THE DIODE SHALL HAVE A RESISTIVE LOAD SUCH THAT THE AVERAGE RECTIFIED CURRENT IS 600 MILLIAMPS.

DIODES WHICH FAIL TO MEET ALL INITIAL MEASUREMENTS AND THE SPECIFIED LIMITS FOR PARAMETRIC CHANGES FOLLOWING BURN-IN SHALL NOT BE ACCEPTABLE.

NOTES:

1. MEASURED WITH A BOONTON ELECTRONIC CORPORATION MODEL NO. 75A-S8 OR EQUIVALENT.
2. MAXIMUM ALLOWABLE AREA WITH PAINT ON DEVICE.



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SHEET 1	SHEET 2	SHEET 3

REVISION STATUS OF SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.005 .02 ANGLES ± ——
DO NOT SCALE THIS DRAWING

MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

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CONTRACT NAS 9-497

DRAWN J.H. Robinson DATE 26 JUL 63
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APPROVAL D.B. [illegible] 13 AUG 63
APPROVAL
NASA APPROVAL W J Rhine 8-14-63
MIT APPROVAL [illegible] 14 Aug 63

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SEMICONDUCTOR DEVICE, DIODE, SILICON

SPECIFICATION CONTROL DRAWING

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SCALE NONE WT SHEET 1 OF 3

INCHES
0 1 2
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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02596	14 Aug 63	WK

THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:

FORWARD VOLTAGE (V_F)

REVERSE CURRENT (I_R)

BURN-IN DATA SHALL BE INCLUDED WITH EACH SHIPMENT. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL DIODE WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF THE ABSOLUTE VALUE OF EACH CHARACTERISTIC AND TO SHOW THE FREQUENCY DISTRIBUTION OF THE PERCENT CHANGE OF EACH CHARACTERISTIC FROM ITS INITIAL READING. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR WHICH EXCEED THE SPECIFIED LIMITS FOR PARAMETRIC CHANGES FOLLOWING BURN-IN SHALL NOT BE ACCEPTABLE.

PARAMETRIC CHANGE LIMITS:

FORWARD VOLTAGE: ± 10% OF INITIAL VALUE.

REVERSE CURRENT: ± 50% OF INITIAL VALUE OR 1 μA WHICHEVER IS GREATER.

TABLE I

MANUFACTURER'S ABSOLUTE MAXIMUM RATING AT AMBIENT TEMPERATURE = 25°C (UNLESS OTHERWISE SPECIFIED)

PEAK INVERSE VOLTAGE (PIV)	RECTIFIED FORWARD CURRENT (I_O)	RECTIFIED FORWARD CURRENT T_A=100°C (I_O)	FORWARD CURRENT STEADY STATE DC (I_F)	RECURRENT PEAK FORWARD CURRENT (I_F)	PEAK FORWARD SURGE CURRENT (I_f) SURGE PULSE WIDTH		POWER DISSIPATION (P)	
					8 MILISEC.	1 SEC.		
V_{DC}	A_{DC}	A_{DC}	A_{DC}	A_{DC}	A	A	WATTS	
500	2	1.2	2	6	20	4	3.4	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

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FINAL FINISH

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REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02596	14 Aug 63	WK

TABLE II

ELECTRICAL CHARACTERISTICS AT AMBIENT TEMPERATURE = 25°C (UNLESS OTHERWISE SPECIFIED)

PARAMETER	CONDITIONS	SYMBOL	SPECIFICATION LIMITS		
			MIN	MAX	UNITS
FORWARD VOLTAGE	I_F = 750 MA	V_F		1.0	VOLT
BREAKDOWN VOLTAGE	I_R = 100 μA	B_V	550		VOLTS
REVERSE CURRENT	V_R = -500V,	I_R		10.0	uA
	V_R = -500V, T_A = 100°C	I_R		125	uA
	V_R = -500V, T_A = 150°C	I_R		300	uA
REVERSE RECOVERY TIME	I_F = 5 MA FORWARD TO I_R = 1 MA REVERSE MEASURED WITH TEKTRONIX 543-TYPE S PLUG IN OR EQUIVALENT	t_{rr}		500	NANOSEC

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LIST OF MATERIALS

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SPECIFICATION CONTROL DRAWING

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SHEET 3 OF 3

INCHES
0 1 2
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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS B PER TDRR 02196	7/24/63	
A	REPLACED BY REV B WITH CHANGES PER TDRR 02256	8/21/67	

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS IN MIL-D-70327.

SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS OF NS 1015404, CLASS 2 .

UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002051 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-P-19491 LEVEL A.

UNITS SHALL BE IN ACCORDANCE WITH MIL-S-19500 IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN.

INSPECTION AND ACCEPTANCE:

MECHANICAL REQUIREMENTS:

MARKING: THE NASA PART NUMBER AND REVISION LETTER, AND THE MANUFACTURER'S NAME, TRADEMARK OR CODE; DATE CODE; LOT CODE, AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART, PER MIL-STD-130. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-P-19491 AND SHALL INCLUDE THE NASA PART NUMBER AND REVISION LETTER.

TERMINAL DATA: GOLD FLASH OVER KOVAR

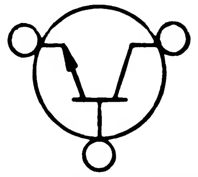
MOUNTING HARDWARE: THE FOLLOWING MOUNTING HARDWARE SHALL BE SUPPLIED WITH EACH UNIT:

- ONE - STEEL WASHER, NICKEL PLATED .200 ± .010 ID X .400 ± .010 OD X .040 ± .010 THICK
- ONE - HEX NUT, (AMERICAN STD) #10-32 NF2B DOUBLE CHAMFERED, NICKEL PLATED
- ONE - INTERNAL TOOTH LOCK WASHER #10 (3/8 OD) NICKEL PLATED
- ONE - SHOULDER WASHER, INSULATING .200 ± .010 ID X .370 ± .010 OD X 1/16" HIGH.
- ONE - INSULATING WASHER - MICA .200 ± .010 ID X .620 ± .010 OD X .003 ± .001 THICK

MECHANICAL DIMENSIONS PER OUTLINE SHOWN

ELECTRICAL REQUIREMENTS: PER TABLE II OR III

- STATIC FORWARD CURRENT TRANSFER RATIO (h_{FE})
- EMITTER CUTOFF CURRENT (I_{EBO})
- COLLECTOR CUTOFF CURRENT (I_{CER})
- SWITCHBACK VOLTAGE (LV_{CEO})
- SATURATION RESISTANCE ($R_{CE(SAT)}$)
- BASE TO EMITTER VOLTAGE (V_{BE})



GRAPHICAL SYMBOL

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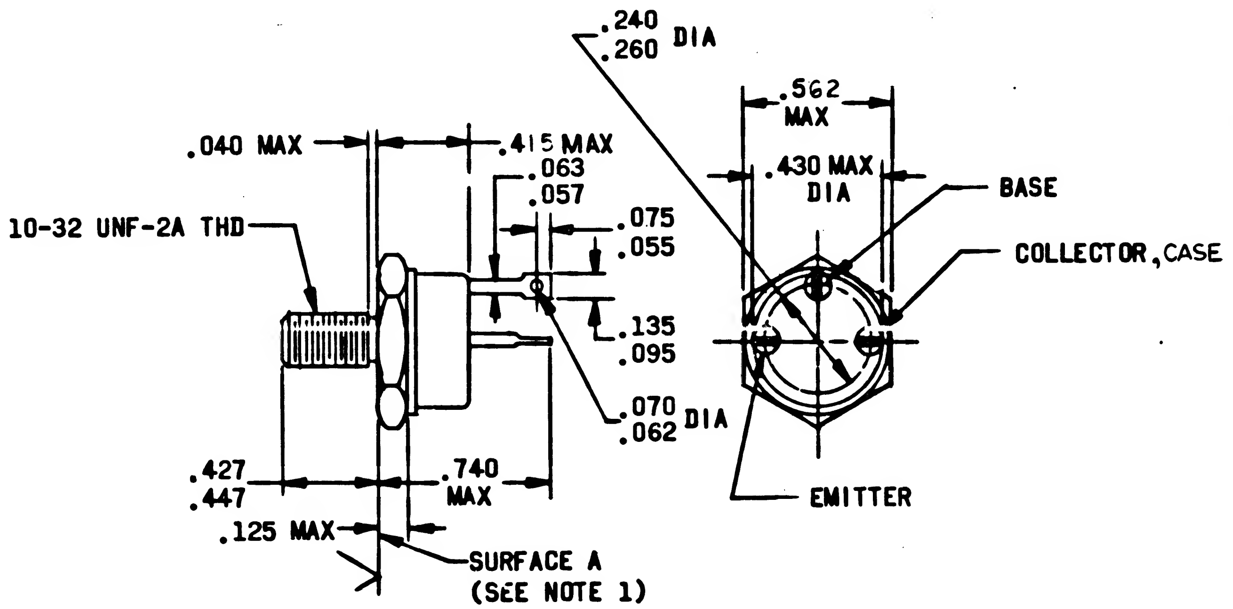
CLASS B RELEASE TDR No. 02196 DATE 7/24/63



Ⓐ REPLACED BY REV B WITH CHANGES

A	A	A
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SHEET 1	SHEET 2	SHEET 3
REVISION STATUS OF SHEETS		

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LIST OF MATERIALS			

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APPLICATION	

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MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

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DWG. NO. CONTRACT NAS9-497
DRAWN DATE 12-JUN-63
CHECKED Wilson 19 June 63
APPROVAL G. BLECK 6/25/63 J. HEPP/C.D. 6/25/63
APPROVAL 7/22/63
NASA APPROVAL
MIT APPROVAL

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TRANSISTOR
NPN, SILICON, STUD MOUNTED

SPECIFICATION CONTROL DRAWING

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SIZE C
NASA DRAWING NO. 1010499
SCALE NONE
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INCHES
0 1 2
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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS B PER TDRR 02196	7/24/63	wk
A	REPLACED BY REV B WITH CHANGES PER TDRR 02756	8/21/63	aw

DESIGN REQUIREMENTS:
STORAGE TEMPERATURE: -65°C TO 175°C
THERMAL RESISTANCE (JUNCTION TO STUD): 3.75°C/WATT MAX
APPLIED TORQUE: UNITS SHALL BE DESIGNED TO WITHSTAND A MINIMUM OF 16 IN-LBS MOUNTING TORQUE.
ELECTRICAL RATING: PER TABLE I
ELECTRICAL SPECIFICATIONS: PER TABLE II OR III
LIFE TEST CONDITIONS FOR ND 1002051 SAME AS BURN-IN CONDITIONS.

SPECIAL CONDITIONING BY SUPPLIER:
HELIUM LEAK TEST: PER ND 1002051
GROSS LEAK TEST: PER ND 1002051
HIGH TEMPERATURE STORAGE: PER ND 1002051 EXCEPT T_A = 175°C AND TIME = 300 HOURS.
BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
STUD TEMPERATURE: $55 {}^{+10}_{-0}$ °C
V_{CE} = 13.0
I_C = 1.0 AMP

THE MANUFACTURE SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO, AT 120 HOURS, AND FOLLOWING BURN-IN:
a. EMITTER CUTOFF CURRENT, I_{EBO}
b. COLLECTOR CUTOFF CURRENT, I_{CBO} AT V_{CE} = 120 VDC
c. COLLECTOR TO EMITTER SATURATION RESISTANCE ($R_{CE(SAT)}$)
d. STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE}

THE DATA SHALL BE PRESENTED IN SUCH A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE TEST READINGS. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS.

HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF:
THE 240 HOUR READINGS OF CHARACTERISTICS a,b,c,d.
THE PERCENT CHANGE OF CHARACTERISTICS a,b,c,d AS CALCULATED FROM THE 120-240 HOUR READINGS.

UNITS FAILING TO MEET THE INITIAL DRAWING REQUIREMENTS OF TABLES I AND II OR THE FOLLOWING POST BURN-IN ACCEPTANCE CRITERIA SHALL NOT BE ACCEPTABLE.
STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE}, SHALL NOT CHANGE MORE THAN ±5% AS CALCULATED FROM THE 120-240 HOUR READINGS.
COLLECTOR CUTOFF CURRENT, I_{CBO}, V_{CE} = 120 VDC SHALL NOT CHANGE MORE THAN TWICE (2X) AS CALCULATED FROM 0-240 HOURS, OR SHOW AN ABSOLUTE INCREASE OF MORE THAN 0.5 MA AS CALCULATED FROM THE 120-240 HOUR READINGS.
SATURATION RESISTANCE $R_{CE(SAT)}$), SHALL NOT CHANGE MORE THAN ±5% AS CALCULATED FROM THE 120-240 HOUR READINGS.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 02196 **DATE** 7/24/63

NOTES:
1. SURFACE A SHALL BE FLAT WITHIN .001 IN/IN. AFTER PLATING.
2. HEAT SINK (ALUMINUM PLATE OR EQUIVALENT) REQUIRED DURING ALL ELECTRICAL TESTS. MAXIMUM JUNCTION TEMPERATURE SHALL NOT EXCEED STORAGE TEMPERATURE. MOUNTING TORQUE FOR TESTING: 11 ± 1 IN-LBS.
3. TO BE SPECIFIED BY MANUFACTURER

Ⓐ REPLACED BY REV B WITH CHANGES

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LIST OF MATERIALS			

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DWG. NO
CONTRACT NAS9-497
DRAWN Weissert DATE 12-JUN 63
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APPROVAL D.R. Test 7/22/63
NASA APPROVAL 7/24/63
MIT APPROVAL 24 July 63

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TRANSISTOR
NPN, SILICON, STUD MOUNTED
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010499
SCALE
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SHEET 2 OF 3

INCHES
0 1 2
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A 1010499

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS B PER TDRR 02196	7/24/63	WK
A	REPLACED BY REV B WITH CHANGES PER TDRR 02756	8/21/63	

TABLE I

MANUFACTURER'S ABSOLUTE MAXIMUM RATINGS TC=25°C

ND	COLLECTOR VOLTAGE (V_{CB})	EMITTER VOLTAGE (V_{EB})	COLLECTOR VOLTAGE (V_{CE})	COLLECTOR CURRENT I_C	COLLECTOR POWER DISSIPATION	EIA TYPE DESIGNATION (FOR REF)	MINNEAPOLIS-HONEYWELL TYPE
	V_{DC}	V_{DC}	V_{DC}	A_{DC}	W		
1010499-1	150	8	100	5	40	2N2634	
-2	120	8	80	5	40		MHT6004

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 02196 DATE 7/24/63

TABLE II

ELECTRICIAL CHARACTERISTICS AT T_C = +25°C

ND	PARAMETER	CONDITIONS	SYMBOL	LIMITS		
				MIN	MAX	UNITS
1010499-1	DC PULSED FORWARD - CURRENT TRANSFER RATIO (PULSE LENGTH ≦ 330 uSEC, DUTY CYCLE ≦ 2%)	I_C = 1A, V_{CE} =2V	h_{FE}	40	120	—
		I_C = 10MA, V_{CE}=2V	h_{FE}	30	—	—
		I_C = 5A, V_{CE} = 5V	h_{FE}	15	—	—
	SATURATION VOLTAGE	I_C=1A, I_B=0.1A	($V_{CE(SAT)}$	—	.25	VDC
		I_C=5A, I_B=0.5A	($V_{CE(SAT)}$	—	2.0	VDC
	COLLECTOR CUTOFF CURRENT	V_{CE}=50V, I_B=0	I_{CEO}	—	100	uADC
		V_{CB}=60V, I_E=0	I_{CBO}	—	0.1	uADC
	EMITTER CUTOFF CURRENT	V_{EB}=8V, I_C=0	I_{EBO}	—	10	uADC
		V_{EB}=5V, I_C=0	I_{EBO}	—	0.1	uADC
	SWITCHBACK VOLTAGE	SEE NOTE 3	LV_{CEO}	SEE NOTE 3	—	VDC

TABLE III

(SEE NOTE 2) ELECTRICAL CHARACTERISTICS AT TC=25°C (UNLESS OTHERWISE SPECIFIED)

ND	PARAMETER	CONDITIONS	SYMBOL	SPECIFICATION LIMITS			
				MIN	AVG	MAX	UNITS
1010499-2	SWITCHBACK VOLTAGE	I_{CE}=100MA, I_B=0	LV_{CEO}	100	-	-	VDC
	EMITTER CUTOFF CURRENT	V_{EB}=5VDC, I_C=0	I_{EBO}	—	—	1.00	MADC
	STATIC FORWARD CURRENT TRANSFER RATIO	V_{CE}=0.6±10%V, I_C=3AMPS	h_{FE}	15	-	25	-
	COLLECTOR CUTOFF CURRENT	V_{CB}=60VDC, I_E=0	I_{CBO}	-		2.0	MADC
		V_{CB}=120VDC, I_E=0	I_{CBO}	-		2.0	MADC
		V_{CE}=60VDC, R=10 Ω, T_A=25±1°C	I_{CER}	-	-	3.0	MADC
	SATURATION RESISTANCE	I_B=0.3A, I_C=3A	R_{CE} (SAT)	-	-	0.15	OHMS
	BASE VOLTAGE	I_C=3A, V_{CE}=0.6±10% VDC	V_{BE}	1.0	-	1.2	VOLTS

Ⓐ REPLACED BY REV B WITH CHANGES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS9-497
DRAWN Weissert DATE 12 JUN 63
CHECKED Wilson 19 June 63
APPROVAL G. BLECK 6/25/63 J. HEPP/C.O 6/25/63
APPROVAL D. Artest 7/22/63
NASA APPROVAL 7/24/63
MIT APPROVAL 24/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR
NPN, SILICON, STUD MOUNTED

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010499
SCALE
WT
SHEET 3 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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B 1010499

REVISIONS 02196

SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02756	8/21/63	

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS IN MIL-D-70327.

SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS OF ND 1015404, CLASS 2.

UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002051 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-P-19491 LEVEL A.

UNITS SHALL BE IN ACCORDANCE WITH MIL-S-19500 IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN.

INSPECTION AND ACCEPTANCE:

MECHANICAL REQUIREMENTS:

MARKING: THE NASA PART NUMBER AND REVISION LETTER, AND THE MANUFACTURER'S NAME, TRADEMARK OR CODE; DATE CODE; LOT CODE, AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART, PER MIL-STD-130. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-P-19491 AND SHALL INCLUDE THE NASA PART NUMBER AND REVISION LETTER.

TERMINAL DATA: GOLD FLASH OVER KOVAR

MOUNTING HARDWARE: THE FOLLOWING MOUNTING HARDWARE SHALL BE SUPPLIED WITH EACH UNIT:

ONE - HEX NUT NO. 10-32 NF-2B DOUBLE CHAMFERED, BRASS WITH NICKEL PLATE.

ONE - INSULATING WASHER - MICA $.205 \pm .005$ I.D. $\times .687 \pm .005$ O.D. $\times .00075 {}^{+.00025}_{-.0000}$ THICK.

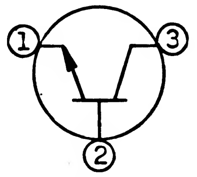
ONE - SHOULDER BUSHING, INSULATING $.191 {}^{+.005}_{-.000}$ I.D. $\times .38 \pm .010$ O.D. $\times .094 \pm .005$ THICKNESS ($.191 {}^{+.005}_{-.000}$ I.D. TO $.250 \pm .005$ O.D.) $\times .064 \pm .005$ THICKNESS ($.250 \pm .005$ I.D. TO $.38 \pm .010$ O.D.)

MECHANICAL DIMENSIONS PER OUTLINE SHOWN

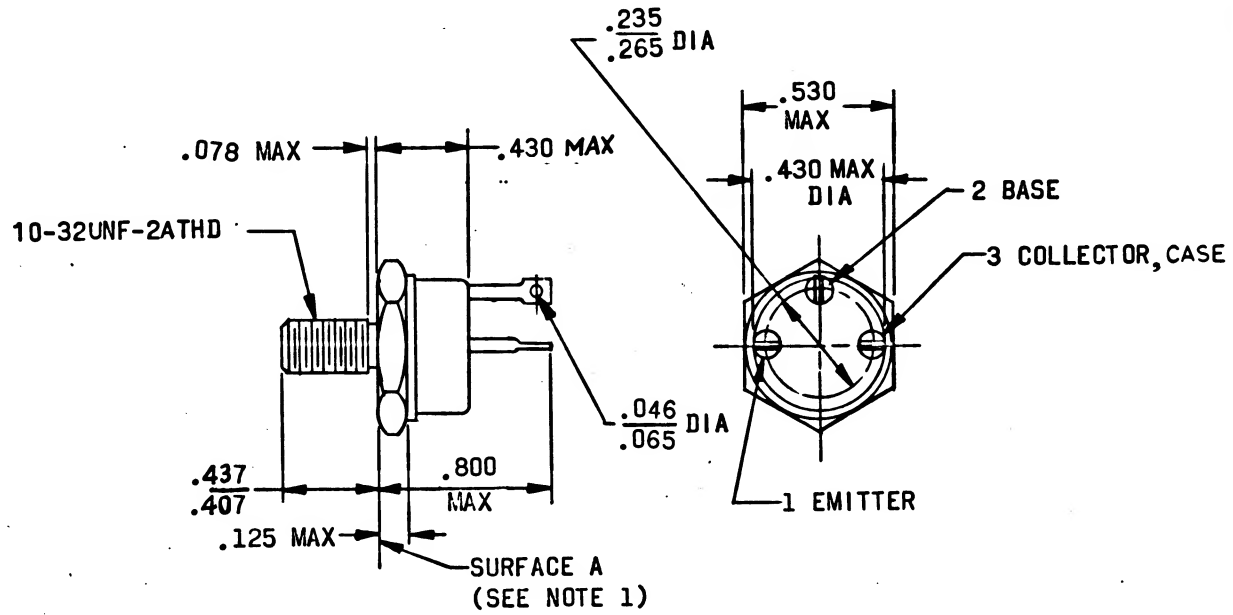
ELECTRIC REQUIREMENTS: PER TABLE II OR III.

STATIC FORWARD CURRENT TRANSFER RATIO (h_{FE})
EMITTER CUTOFF CURRENT (I_{EBO})
COLLECTOR CUTOFF CURRENT (I_{CER})
SWITCHBACK VOLTAGE (LV_{CEO})
SATURATION RESISTANCE ($R_{CE(SAT)}$)
BASE TO EMITTER VOLTAGE (V_{BE}).

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



GRAPHICAL SYMBOL



B	B	B
SHEET 1	SHEET 2	SHEET 3

REVISION STATUS OF SHEETS

Ⓑ **REPLACES REV(A)WITH CHANGE**

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS9-497
DRAWN P. Foster DATE 2-AUG 63
CHECKED Hogue 3 AUG 63
APPROVAL D. B. Test 21 Aug 63
APPROVAL
NASA APPROVAL W. J. Swing 8/21/63
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR
NPN, SILICON, STUD MOUNTED

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010499
SCALE NONE
WT
SHEET 1 OF 3

1010499

INCHES
0 1 2
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REVISIONS 02/96			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02756	8/21/63	

DESIGN REQUIREMENTS:

STORAGE AND OPERATING JUNCTION TEMPERATURE: -65°C TO +175°C
THERMAL RESISTANCE (JUNCTION TO STUD): 3.75°C/WATT MAX
APPLIED TORQUE: UNITS SHALL BE DESIGNED TO WITHSTAND A MINIMUM OF 15 IN-LBS MOUNTING TORQUE.
ELECTRICAL RATING: PER TABLE I
ELECTRICAL SPECIFICATIONS: PER TABLE II OR III
LIFE TEST CONDITIONS FOR ND 1002051 SAME AS BURN-IN CONDITIONS.

SPECIAL CONDITIONING BY SUPPLIER:

HELIUM LEAK TEST: PER ND 1002051
GROSS LEAK TEST: PER ND 1002051
HIGH TEMPERATURE STORAGE: PER ND 1002051 EXCEPT T_A = 175°C AND TIME = 300 HOURS.
BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
STUD TEMPERATURE: $55 {}^{+10}_{-0}$ °C
V_{CB} = 13.3
I_C = 1.0 AMP

THE MANUFACTURE SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO, AT 120 HOURS, AND FOLLOWING BURN-IN:

a. EMITTER CUTOFF CURRENT, I_{EBO} AT V_{EB} = 5 VDC.
b. COLLECTOR CUTOFF CURRENT, I_{CBO} AT V_{CB} = 120 VDC FOR 1010499-2, 60 VDC FOR 1010499-1.
c. COLLECTOR TO EMITTER SATURATION RESISTANCE ($R_{CE(SAT)}$), OR SATURATION VOLTAGE ($V_{CE(SAT)}$).
d. STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE} AT I_C = 5 AMPS FOR 1010499-1, AT I_C = 3 AMPS FOR 1010499-2.

THE DATA SHALL BE PRESENTED IN SUCH A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE TEST READINGS. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS.

HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF:

THE 240 HOUR READINGS OF CHARACTERISTICS a,b,c,d.
THE PERCENT CHANGE OF CHARACTERISTICS a,b,c,d, AS CALCULATED FROM THE 120-240 HOUR READINGS.

UNITS FAILING TO MEET THE INITIAL DRAWING REQUIREMENTS OF TABLES II OR III AND THE FOLLOWING POST BURN-IN ACCEPTANCE CRITERIA SHALL NOT BE ACCEPTABLE.

STATIC FORWARD CURRENT TRANSFER RATIO, h_{fe} SHALL NOT CHANGE MORE THAN ±5% AS CALCULATED FROM THE 120-240 HOUR READINGS.

COLLECTOR CUTOFF CURRENT, I_{CBO}, V_{CB} = 120 VDC SHALL NOT CHANGE MORE THAN THREE TIMES (3X) AS CALCULATED FROM 0-240 HOURS, OR SHOW AN ABSOLUTE INCREASE OF MORE THAN 50µA AS CALCULATED FROM THE 120-240 HOUR READINGS. DEVICES WITH INITIAL LEAKAGES LESS THAN 1 NANOAMP MAY INCREASE TO 3.0 NANOAMPS.

SATURATION RESISTANCE $R_{CE(SAT)}$), OR SATURATION VOLTAGE ($V_{CE(SAT)}$), SHALL NOT CHANGE MORE THAN ±5% AS CALCULATED FROM THE 120-240 HOUR READINGS.

NOTES:

1. SURFACE A SHALL BE FLAT WITHIN .002 IN./IN. AFTER PLATING, EXCLUDING STUD UNDERCUT.
2. HEAT SINK (ALUMINUM PLATE OR EQUIVALENT) OR PULSE TESTING AT 300±30 µSEC, 2% DUTY CYCLE, REQUIRED DURING ALL ELECTRICAL TESTS.

MOUNTING TORQUE FOR TESTING: 11±1 IN-LBS.

MASTER

Ⓑ **REPLACES REV A WITH CHANGE**

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

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FRACTIONS ± DECIMALS ± ANGLES ±
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MIT APPROVAL D. Hafel 8/21/63

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INCHES
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B 1010499

REVISIONS 02196			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02756	8/21/63	Du

TABLE I

MANUFACTURER'S ABSOLUTE MAXIMUM RATINGS $T_C=25^\circ C$

ND	COLLECTOR VOLTAGE (V_{CB})	EMITTER VOLTAGE (V_{EB})	COLLECTOR VOLTAGE (V_{CER})	COLLECTOR CURRENT I_C	COLLECTOR POWER DISSIPATION	EIA TYPE DESIGNATION (FOR REF)
	V_{DC}	V_{DC}	V_{DC}	A_{DC}	W	
1010499-1	150	8	100	5	40	2N2634
-2	150	8	100	5	40	

TABLE II

ELECTRICIAL CHARACTERISTICS AT T_C = +25°C (SEE NOTE 2)

ND	PARAMETER	CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	LIMITS UNITS
1010499-1	DC PULSED FORWARD - CURRENT TRANSFER RATIO (PULSE LENGTH ≦ 330 uSEC, DUTY CYCLE ≦ 2%)	I_C = 1A, V_{CE} =2V	h_{FE}	40	120	—
		I_C = 10MA, V_{CE}=2V	h_{FE}	30	—	—
		I_C = 5A, V_{CE} = 5V	h_{FE}	15	—	—
	SATURATION VOLTAGE	I_C=1A, I_B=0.1A	($V_{CE(SAT)}$)	—	.25	VDC
		I_C=5A, I_B=0.5A	($V_{CE(SAT)}$)	—	2.0	VDC
	COLLECTOR CUTOFF CURRENT	V_{CB}=50V, I_B=0	I_{CEO}	—	100	uADC
		V_{CB}=60V, I_E=0	I_{CBO}	—	0.1	uADC
	EMITTER CUTOFF CURRENT	V_{EB}=8V, I_C=0	I_{EBO}	—	10	uADC
		V_{EB}=5V, I_C=0	I_{EBO}	—	0.1	uADC
	SWITCHBACK VOLTAGE	I_C=100MA, I_B=0	LV_{CEO}	90	—	VDC

TABLE III

(SEE NOTE 2) ELECTRICAL CHARACTERISTICS AT TC-25°C (UNLESS OTHERWISE SPECIFIED)

ND	PARAMETER	CONDITIONS	SYMBOL	SPECIFICATION LIMITS MIN	AVG	MAX	UNITS
1010499-2	SWITCHBACK VOLTAGE	I_{CE}=100MA, I_B=0	LV_{CEO}	90	-	-	VDC
	EMITTER CUTOFF CURRENT	V_{EB}=5VDC, I_C=0	I_{EBO}	—		100	µADC
	STATIC FORWARD CURRENT TRANSFER RATIO	V_{CE}=0.6±10%V, I_C=3AMPS	h_{FE}	10	-	30	-
	COLLECTOR CUTOFF CURRENT	V_{CB}=60VDC, I_E=0	I_{CBO}	-		2.0	µADC
		V_{CB}=120VDC, I_E=0	I_{CBO}	-		20	µADC
		V_{CE}=80VDC, R=10Ω, T_A=25±1°C	I_{CER}	-	-	100	µADC
	SATURATION RESISTANCE	I_B=0.3A, I_C=3A	R_{CE} (SAT)	-	-	0.15	OHMS
	BASE VOLTAGE	I_C=3A, V_{CE}=0.6±10% VDC	V_{BE}	0.8	-	1.2	VOLTS

Ⓑ REPLACES REV A WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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DO NOT SCALE THIS DRAWING
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MIT APPROVAL L Hafel 8/21/63

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
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SCALE
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C 1010499

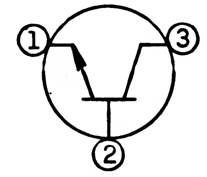
REVISIONS 02196			
SYM	DESCRIPTION	DATE	APPROVAL
B	Ⓜ REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02756	8/21/63	Dw
C	REVISED PER TDRR 06246	2-18-64	WK

REQUIREMENTS:

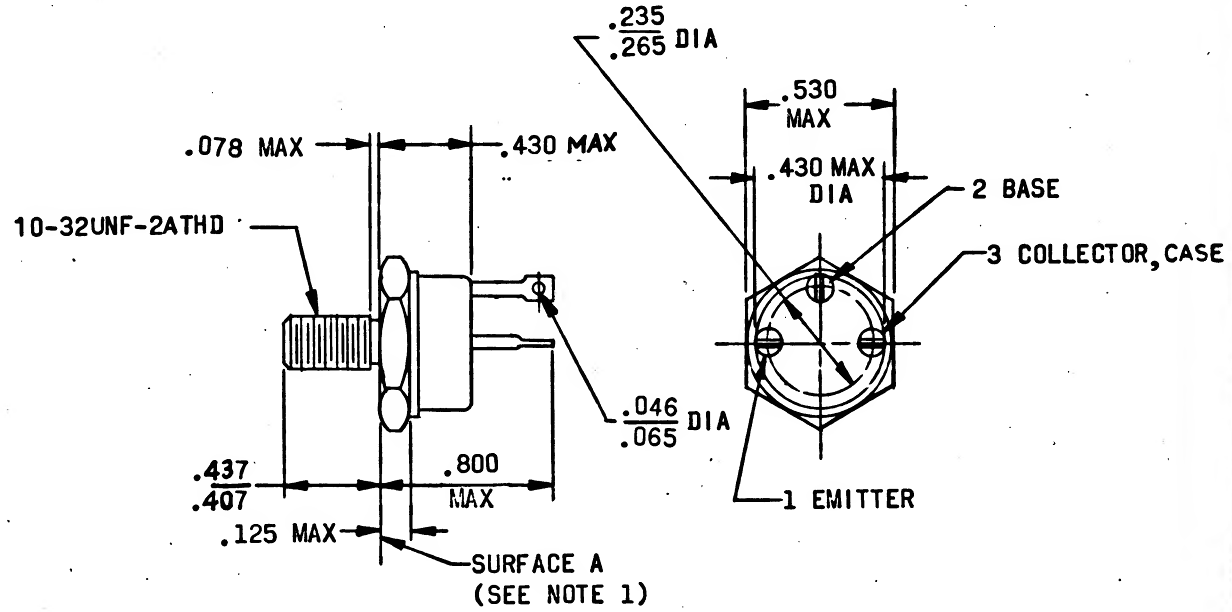
1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS IN MIL-D-70327.
   - B. SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS OF ND 1015404, CLASS 2.
   - C. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002051 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - D. UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-S-19491 LEVEL A.
   - E. UNITS SHALL BE IN ACCORDANCE WITH MIL-S-19500 IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MARKING: THE NASA PART NUMBER AND REVISION LETTER, AND THE MANUFACTURER'S NAME, TRADEMARK OR CODE; DATE CODE; LOT CODE, AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART, PER ND 1002019 THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-S-19491 AND SHALL INCLUDE THE NASA PART NUMBER AND REVISION LETTER.
     - (2) TERMINAL DATA: GOLD FLASH OVER KOVAR
     - (3) MOUNTING HARDWARE: THE FOLLOWING MOUNTING HARDWARE SHALL BE SUPPLIED WITH EACH UNIT:
       - a. ONE - HEX NUT NO. 10-32 NF-2B DOUBLE CHAMFERED, BRASS WITH NICKEL PLATE.
       - b. ONE - INSULATING WASHER - MICA $.205 \pm .005$ I.D. x $.687 \pm .005$ O.D. X $.00075\,{}^{+.00025}_{-.0000}$ THICK.
       - c. ONE - SHOULDER BUSHING, INSULATING $.191\,{}^{+.005}_{-.000}$ I.D. X $.38 \pm .010$ O.D. X $.094 \pm .005$ THICKNESS ($.191\,{}^{+.005}_{-.000}$ I.D. TO $.250 \pm .005$ O.D.) X $.064 \pm .005$ THICKNESS ($.250 \pm .005$ I.D. TO $.38 \pm .010$ O.D.)
     - (4) MECHANICAL DIMENSIONS PER OUTLINE SHOWN
   - B. ELECTRIC REQUIREMENTS: PER TABLE II OR III.
     - (1) STATIC FORWARD CURRENT TRANSFER RATIO (h_{FE})
     - (2) EMITTER CUTOFF CURRENT (I_{EBO})
     - (3) COLLECTOR CUTOFF CURRENT (I_{CER})
     - (4) SWITCHBACK VOLTAGE (LV_{CEO})
     - (5) SATURATION RESISTANCE ($R_{CE(SAT)}$)
     - (6) BASE TO EMITTER VOLTAGE (V_{BE}).

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



GRAPHICAL SYMBOL



C	C	B
B	B	B
SHEET 1	SHEET 2	SHEET 3

REVISION STATUS OF SHEETS

Ⓑ REPLACES REV(A) WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIN NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS9-497
DRAWN C. Foster DATE 2-AUG 63
CHECKED Hogue 3 AUG 63
APPROVAL D. B. Test 21 Aug 63
APPROVAL
NASA APPROVAL W. S. Survy 8/21/63
MIT APPROVAL L. Wafel 8/21/63

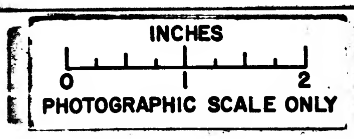
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR
NPN, SILICON, STUD MOUNTED

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010499
SCALE NONE
WT
SHEET 1 OF 3

MASTER



PHOTOGRAPHIC SCALE ONLY

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REVISIONS 02/96			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02756	8/21/63	
C	REVISED PER TDRR 06246	2-18-64	WK

3. DESIGN REQUIREMENTS:
   A. STORAGE AND OPERATING JUNCTION TEMPERATURE: -65°C TO +175°C
   B. THERMAL RESISTANCE (JUNCTION TO STUD): 3.75°C/WATT MAX
   C. APPLIED TORQUE: UNITS SHALL BE DESIGNED TO WITHSTAND A MINIMUM OF 15 IN-LBS MOUNTING TORQUE.
   D. ELECTRICAL RATING: PER TABLE I
   E. ELECTRICAL SPECIFICATIONS: PER TABLE II OR III
   F. LIFE TEST CONDITIONS FOR ND 1002051 SAME AS BURN-IN CONDITIONS.

4. SPECIAL CONDITIONING BY SUPPLIER:
   A. HELIUM LEAK TEST: PER ND 1002051
   B. GROSS LEAK TEST: PER ND 1002051
   C. HIGH TEMPERATURE STORAGE: PER ND 1002051 EXCEPT T_A = 175°C AND TIME = 300 HOURS.
   D. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
      (1) STUD TEMPERATURE: $55\ {}^{+10}_{-0}$°C
      (2) V_{CB} = 13.3
      (3) I_C = 1.0 AMP
   E. THE MANUFACTURE SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO, AT 120 HOURS, AND
      (1) FOLLOWING BURN-IN:
         a. EMITTER CUTOFF CURRENT, I_{EBO} AT V_{EB} = 5 VDC.
         b. COLLECTOR CUTOFF CURRENT, I_{CBO} AT V_{CB} = 120 VDC. FOR 1010499-2, 60 VDC FOR 1010499-1.
         c. COLLECTOR TO EMITTER SATURATION RESISTANCE ($R_{CE(SAT)}$), OR SATURATION VOLTAGE ($V_{CE(SAT)}$).
         d. STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE} AT I_C = 5 AMPS FOR 1010499-1, AT I_C = 3 AMPS FOR 1010499-2.
   F. THE DATA SHALL BE PRESENTED IN SUCH A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE TEST READINGS. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS.
   G. HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF:
      (1) THE 240 HOUR READINGS OF CHARACTERISTICS a,b,c,d.
      (2) THE PERCENT CHANGE OF CHARACTERISTICS a,b,c,d, AS CALCULATED FROM THE 120-240 HOUR READINGS.
   H. UNITS FAILING TO MEET THE INITIAL DRAWING REQUIREMENTS OF TABLES II OR III AND THE FOLLOWING POST BURN-IN ACCEPTANCE CRITERIA SHALL NOT BE ACCEPTABLE.
      (1) STATIC FORWARD CURRENT TRANSFER RATIO, h_{fe} SHALL NOT CHANGE MORE THAN ±5% AS CALCULATED FROM THE 120-240 HOUR READINGS.
      (2) COLLECTOR CUTOFF CURRENT, I_{CBO}, V_{CB} = 120 VDC SHALL NOT CHANGE MORE THAN FIVE TIMES (5X) OR SHOW AN ABSOLUTE INCREASE OF MORE THAN 20µA AS CALCULATED FROM THE 120-240 HOUR READINGS FOR BOTH CASES. DEVICES WITH INITIAL LEAKAGES LESS THAN 1 NANOAMP MAY INCREASE TO 5.0 NANOAMPS.
      (3) SATURATION RESISTANCE $R_{CE(SAT)}$), OR SATURATION VOLTAGE ($V_{CE(SAT)}$), SHALL NOT CHANGE MORE THAN ±10% OR THE EQUIVALENT OF .01 OHMS, WHICHEVER IS GREATER, AS CALCULATED FROM THE 120-240 HOUR READINGS.

NOTES:
1. SURFACE A SHALL BE FLAT WITHIN .002 IN./IN. AFTER PLATING, EXCLUDING STUD UNDERCUT.
2. HEAT SINK (ALUMINUM PLATE OR EQUIVALENT) OR PULSE TESTING AT 300±30 µSEC, 2% DUTY CYCLE, REQUIRED DURING ALL ELECTRICAL TESTS.

MOUNTING TORQUE FOR TESTING: 11±1 IN-LBS.

Ⓑ REPLACES REV A WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS9-497
DRAWN Weissert DATE 1-AUG-63
CHECKED Hogue 3 AUG 63
APPROVAL D. G. Hoag 21 Aug 63
APPROVAL
NASA APPROVAL W. F. Swingle 8/21/63
MIT APPROVAL I Hafel 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR
NPN, SILICON, STUD MOUNTED

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010499
SCALE
WT
SHEET 2 OF 3

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

D | 1010499

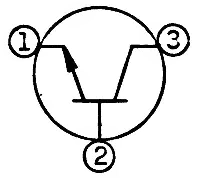
REVISIONS 02176			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02756	8/21/63	
C	REVISED PER TDRR 06246	2-18-64	WK
D	REVISED PER TDRR 18758	5/11/65	WK

REQUIREMENTS:

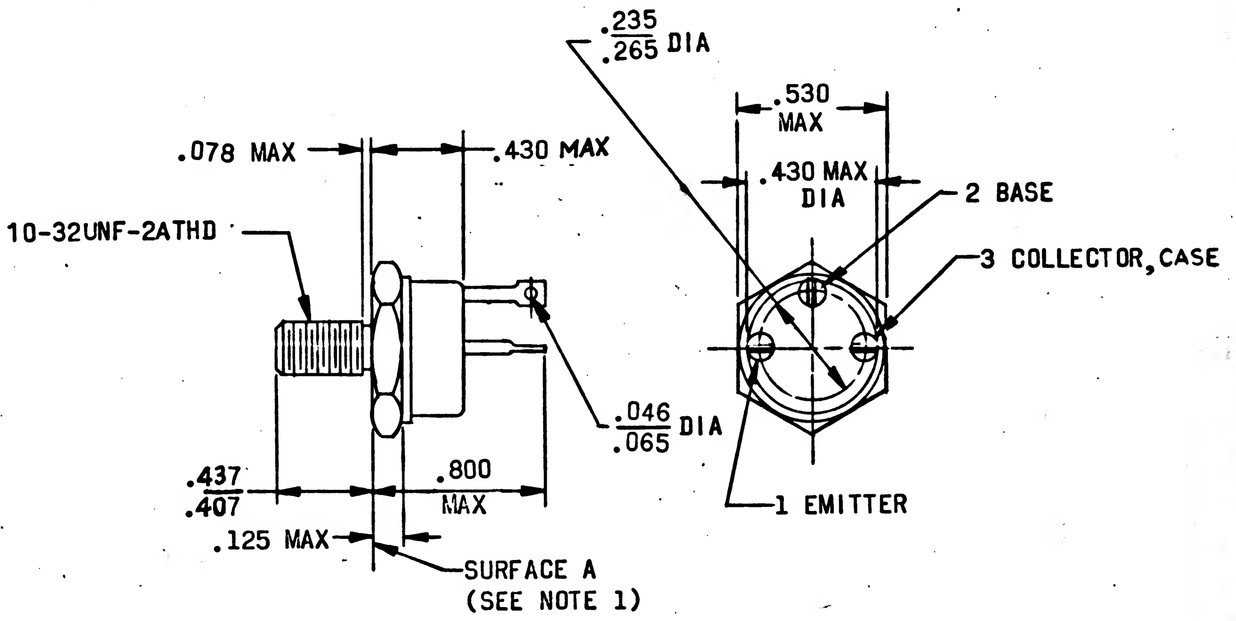
1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS OF ND 1015404, CLASS 2.
   - C. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002051 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - D. PRESERVATION, PACKING, PACKAGING AND CONTAINER MARKING PER ND 1002215 CLASS I, CODE 2.
   - E. UNITS SHALL BE IN ACCORDANCE WITH MIL-S-19500 IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MARKING: THE NASA PART NUMBER AND REVISION LETTER, AND THE MANUFACTURER'S NAME, TRADEMARK OR CODE; DATE CODE; LOT CODE, AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART, PER ND 1002019 THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.
     - (2) TERMINAL DATA: GOLD FLASH OVER KOVAR
     - (3) MOUNTING HARDWARE: THE FOLLOWING MOUNTING HARDWARE SHALL BE SUPPLIED WITH EACH UNIT:
       - a. ONE - HEX NUT NO. 10-32 NF-2B DOUBLE CHAMFERED, BRASS WITH NICKEL PLATE.
       - b. ONE - INSULATING WASHER - MICA .205 ± .005 I.D. X .687 ± .005 O.D. X $.00075^{+.00025}_{-.0000}$ THICK.
       - c. ONE - SHOULDER BUSHING, INSULATING $.191^{+.005}_{-.000}$ I.D. X .38 ± .010 O.D. X .094 ± .005 THICKNESS ($.191^{+.005}_{-.000}$ I.D. TO .250 ± .005 O.D.) X .064 ± .005 THICKNESS (.250 ± .005 I.D. TO .38 ± .010 O.D.)
     - (4) MECHANICAL DIMENSIONS PER OUTLINE SHOWN
   - B. ELECTRIC REQUIREMENTS: PER TABLE II OR III.
     - (1) STATIC FORWARD CURRENT TRANSFER RATIO (h_{FE})
     - (2) EMITTER CUTOFF CURRENT (I_{EBO})
     - (3) COLLECTOR CUTOFF CURRENT (I_{CER})
     - (4) SWITCHBACK VOLTAGE (LV_{CEO})
     - (5) SATURATION RESISTANCE ($R_{CE(SAT)}$)
     - (6) BASE TO EMITTER VOLTAGE (V_{BE}).

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



GRAPHICAL SYMBOL



Ⓑ REPLACES REV (A) WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS9-497
DRAWN C. Foster DATE 2-AUG-63
CHECKED Hogue 3 AUG 63
APPROVAL D. B. Test 21 Aug 63
APPROVAL
NASA APPROVAL 8/21/63
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR
NPN, SILICON, STUD MOUNTED

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010499
SCALE NONE
WT
SHEET 1 OF 3

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REVISIONS 02/96

SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02756	8/21/63	
C	REVISED PER TDRR 06246	2-18-64	
D	REVISED PER TDRR 18758	5/11/65	

3. DESIGN REQUIREMENTS:

A. STORAGE AND OPERATING JUNCTION TEMPERATURE: -65°C TO +175°C
B. THERMAL RESISTANCE (JUNCTION TO STUD): 3.75°C/WATT MAX
C. APPLIED TORQUE: UNITS SHALL BE DESIGNED TO WITHSTAND A MINIMUM OF 15 IN-LBS MOUNTING TORQUE.
D. ELECTRICAL RATING: PER TABLE I
E. ELECTRICAL SPECIFICATIONS: PER TABLE II OR III
F. LIFE TEST CONDITIONS FOR ND 1002051 SAME AS BURN-IN CONDITIONS.

4. SPECIAL CONDITIONING BY SUPPLIER:

A. HELIUM LEAK TEST: PER ND 1002051
B. GROSS LEAK TEST: PER ND 1002051
C. HIGH TEMPERATURE STORAGE: PER ND 1002051 EXCEPT $T_A = 175^{o}C$ AND TIME = 300 HOURS.
D. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
  (1) STUD TEMPERATURE: 100°C
  (2) $V_{CB} = 13$ VDC MINIMUM
  (3) Pdis = 7 WATTS
E. THE MANUFACTURE SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO, AT 120 HOURS, AND
  (1) FOLLOWING BURN-IN:
    a. EMITTER CUTOFF CURRENT, I_{EBO} AT $V_{EB} = 5$ VDC.
    b. COLLECTOR CUTOFF CURRENT, I_{CBO} AT $V_{CB} = 120$ VDC. FOR 1010499-2, 60 VDC FOR 1010499-1.
    c. COLLECTOR TO EMITTER SATURATION RESISTANCE ($R_{CE(SAT)}$), OR SATURATION VOLTAGE ($V_{CE(SAT)}$).
    d. STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE} AT I_C = 5 AMPS FOR 1010499-1, AT I_C = 3 AMPS FOR 1010499-2.
F. THE DATA SHALL BE PRESENTED IN SUCH A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE TEST READINGS. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS.
G. HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF:
  (1) THE 240 HOUR READINGS OF CHARACTERISTICS a,b,c,d.
  (2) THE PERCENT CHANGE OF CHARACTERISTICS a,b,c,d, AS CALCULATED FROM THE 120-240 HOUR READINGS.
H. UNITS FAILING TO MEET THE INITIAL DRAWING REQUIREMENTS OF TABLES II OR III AND THE FOLLOWING POST BURN-IN ACCEPTANCE CRITERIA SHALL NOT BE ACCEPTABLE.
  (1) STATIC FORWARD CURRENT TRANSFER RATIO, h_{fe} SHALL NOT CHANGE MORE THAN ±5% AS CALCULATED FROM THE 120-240 HOUR READINGS.
  (2) COLLECTOR CUTOFF CURRENT, I_{CBO}, V_{CB} = 120 VDC SHALL NOT CHANGE MORE THAN FIVE TIMES (5X) OR SHOW AN ABSOLUTE INCREASE OF MORE THAN 20µA AS CALCULATED FROM THE 120-240 HOUR READINGS FOR BOTH CASES. DEVICES WITH INITIAL LEAKAGES LESS THAN 1 NANOAMP MAY INCREASE TO 5.0 NANOAMPS.
  (3) SATURATION RESISTANCE $R_{CE(SAT)}$), OR SATURATION VOLTAGE ($V_{CE(SAT)}$), SHALL NOT CHANGE MORE THAN ±10% OR THE EQUIVALENT OF .01 OHMS, WHICHEVER IS GREATER, AS CALCULATED FROM THE 120-240 HOUR READINGS.

NOTES:

1. SURFACE A SHALL BE FLAT WITHIN .002 IN./IN. AFTER PLATING, EXCLUDING STUD UNDERCUT.
2. HEAT SINK (ALUMINUM PLATE OR EQUIVALENT) OR PULSE TESTING AT 300±30 µSEC, 2% DUTY CYCLE, REQUIRED DURING ALL ELECTRICAL TESTS.

MOUNTING TORQUE FOR TESTING: 11±1 IN-LBS.

MASTER

Ⓑ REPLACES REV A WITH CHANGE

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NEXT ASSY	USED ON
APPLICATION	

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MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR
NPN, SILICON, STUD MOUNTED
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	1010499

SCALE WT SHEET 2 OF 3

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1010499 D

REVISIONS 02196

SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02756	8/21/63	
C	REVISED PER TDRR 06246		WK
D	REVISED PER TDRR 18758	5/11/65	WK

TABLE I

MANUFACTURER'S ABSOLUTE MAXIMUM RATINGS TC=25°C

ND	COLLECTOR VOLTAGE (V_{CB})	EMITTER VOLTAGE (V_{EB})	COLLECTOR VOLTAGE (V_{CER})	COLLECTOR CURRENT I_C	COLLECTOR POWER DISSIPATION	EIA TYPE DESIGNATION (FOR REF)
	V_{DC}	V_{DC}	V_{DC}	A_{DC}	W	
1010499-1	150	8	100	5	40	2N2634
-2	150	8	100	5	40	

TABLE II

ELECTRICIAL CHARACTERISTICS AT T_C = +25°C (SEE NOTE 2)

ND	PARAMETER	CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	LIMITS UNITS
1010499-1	DC PULSED FORWARD - CURRENT TRANSFER RATIO (PULSE LENGTH ≦ 330 uSEC, DUTY CYCLE ≦ 2%)	I_C = 1A, V_{CE} =2V	h_{FE}	40	120	—
		I_C = 10MA, V_{CE}=2V	h_{FE}	30	—	—
		I_C = 5A, V_{CE} = 5V	h_{FE}	15	—	—
	SATURATION VOLTAGE	I_C=1A, I_B=0.1A	($V_{CE(SAT)}$)	—	.25	VDC
		I_C=5A, I_B=0.5A	($V_{CE(SAT)}$)	—	2.0	VDC
	COLLECTOR CUTOFF CURRENT	V_{CB}=50V, I_B=0	I_{CEO}	—	100	uADC
		V_{CB}=60V, I_E=0	I_{CBO}	—	0.1	uADC
	EMITTER CUTOFF CURRENT	V_{EB}=8V, I_C=0	I_{EBO}	—	10	uADC
		V_{EB}=5V, I_C=0	I_{EBO}	—	0.1	uADC
	SWITCHBACK VOLTAGE	I_C=100MA, I_B=0	LV_{CEO}	90	—	VDC

TABLE III

(SEE NOTE 2) ELECTRICAL CHARACTERISTICS AT TC-25°C (UNLESS OTHERWISE SPECIFIED)

ND	PARAMETER	CONDITIONS	SYMBOL	SPECIFICATION LIMITS MIN	AVG	MAX	UNITS
1010499-2	SWITCHBACK VOLTAGE	I_{CE}=100MA, I_B=0	LV_{CEO}	90	-	-	VDC
	EMITTER CUTOFF CURRENT	V_{EB}=5VDC, I_C=0	I_{EBO}	—		100	μADC
	STATIC FORWARD CURRENT TRANSFER RATIO	V_{CE}=0.6±10%V, I_C=3AMPS	h_{FE}	10	-	30	-
	COLLECTOR CUTOFF CURRENT	V_{CB}=60VDC, I_E=0	I_{CBO}	-		2.0	μADC
		V_{CB}=120VDC, I_E=0	I_{CBO}	-		20	μADC
		V_{CE}=80VDC, R=10Ω, T_A=25±1°C	I_{CER}	-	-	100	μADC
	SATURATION RESISTANCE	I_B=0.3A, I_C=3A	R_{CE} (SAT)	-	-	0.15	OHMS
	BASE VOLTAGE	I_C=3A, V_{CE}=0.6±10% VDC	V_{BE}	0.8	-	1.2	VOLTS

Ⓑ REPLACES REV A WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

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MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO
CONTRACT NAS9-497

DRAWN Weisert DATE 2 AUG 63
CHECKED Hogue 3 AUG 63
APPROVAL 21 Aug 63
APPROVAL
NASA APPROVAL 8/21/63
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR
NPN, SILICON, STUD MOUNTED

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	1010499
SCALE	WT	SHEET 3 OF 3

MASTER

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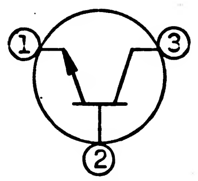
1010499 E

REVISIONS 02196

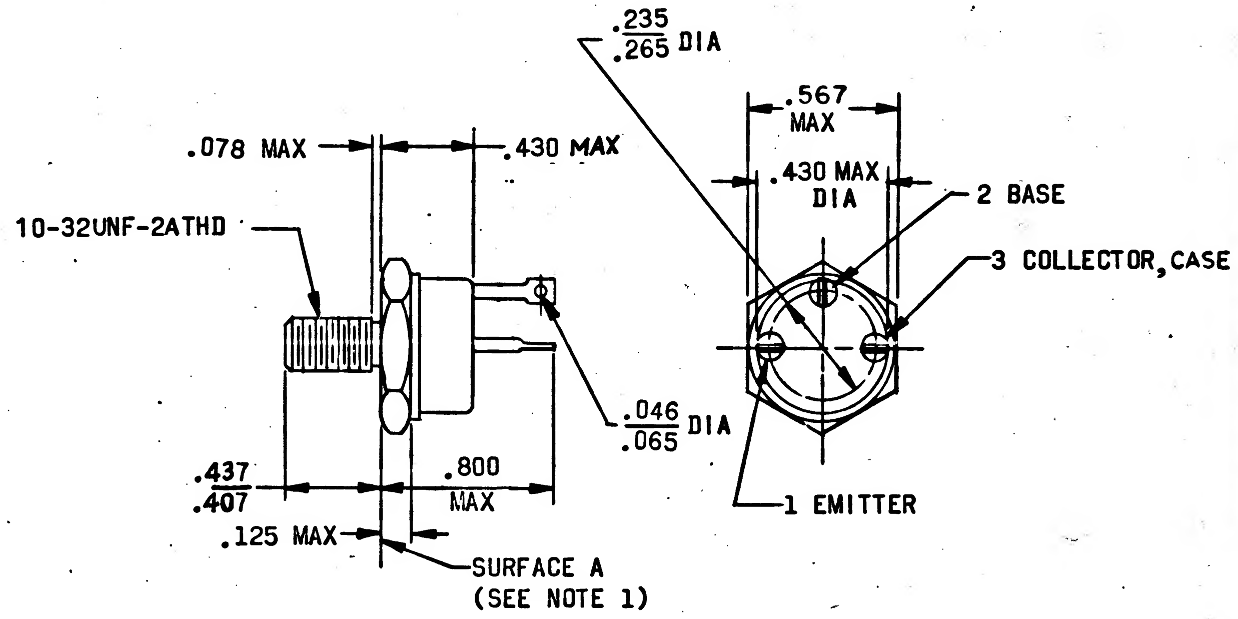
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02756	8/21/63	Dlo
C	REVISED PER TDRR 06246	2-18-64	WK
D	REVISED PER TDRR 18758	5/11/65	WK
E	REVISED PER TDRR 22043	9/14	MGM

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS OF ND 1015404, CLASS 2.
   - C. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002051
   - D. PRESERVATION, PACKING, PACKAGING AND CONTAINER MARKING PER ND 1002215 CLASS I, CODE 2.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MARKING: THE NASA DRAWING NUMBER WHICH SHALL CONSIST OF AT LEAST THE LAST THREE DIGITS; DASH NUMBER ; THE MANUFACTURER'S NAME, TRADEMARK OR CODE; DATE CODE; LOT CODE; AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND-1002019.
     - (2) TERMINAL DATA: GOLD FLASH OVER KOVAR
     - (3) MECHANICAL DIMENSIONS PER OUTLINE SHOWN.
   - B. ELECTRIC REQUIREMENTS: PER TABLE II OR III.
     - (1) STATIC FORWARD CURRENT TRANSFER RATIO (h_{FE})
     - (2) EMITTER CUTOFF CURRENT (I_{EBO})
     - (3) COLLECTOR CUTOFF CURRENT (I_{CER})
     - (4) SWITCHBACK VOLTAGE (LV_{CEO})
     - (5) SATURATION RESISTANCE ($R_{CE(SAT)}$)
     - (6) BASE TO EMITTER VOLTAGE (V_{BE}).



GRAPHICAL SYMBOL



Ⓑ **REPLACES REV(A)WITH CHANGE**

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

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CONTRACT NAS9-497
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APPROVAL D. E. Test 21 Aug 63
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MIT APPROVAL 8/21/63

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TRANSISTOR
NPN, SILICON, STUD MOUNTED

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010499
SCALE NONE
WT
SHEET 1 OF 3

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

E | 1010499

REVISIONS 02/96			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 62756	8/21/63	
C	REVISED PER TDRR 06246	2-18-64	
D	REVISED PER TDRR 18758	5/11/65	
E	REVISED PER TDRR 22043	9/14	

3. DESIGN REQUIREMENTS:
   - A. STORAGE AND OPERATING JUNCTION TEMPERATURE: -65°C TO +175°C
   - B. THERMAL RESISTANCE (JUNCTION TO STUD): 3.75°C/WATT MAX
   - C. APPLIED TORQUE: UNITS SHALL BE DESIGNED TO WITHSTAND A MINIMUM OF 15 IN-LBS MOUNTING TORQUE.
   - D. ELECTRICAL RATING: PER TABLE I
   - E. ELECTRICAL SPECIFICATIONS: PER TABLE II OR III
   - F. LIFE TEST CONDITIONS FOR ND 1002051 SAME AS BURN-IN CONDITIONS.

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. HELIUM LEAK TEST: PER ND 1002051
   - B. GROSS LEAK TEST: PER ND 1002051
   - C. HIGH TEMPERATURE STORAGE: PER ND 1002051 EXCEPT T_A = 175°C AND TIME = 300 HOURS.
   - D. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
     - (1) STUD TEMPERATURE: 100°C
     - (2) V_{CB} = 13 VDC MINIMUM
     - (3) Pdis = 7 WATTS
   - E. THE MANUFACTURE SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO, AT 120 HOURS, AND
     - (1) FOLLOWING BURN-IN:
       - a. EMITTER CUTOFF CURRENT, I_{EBO} AT V_{EB} = 5 VDC.
       - b. COLLECTOR CUTOFF CURRENT, I_{CBO} AT V_{CB} = 120 VDC. FOR 1010499-2, 60 VDC FOR 1010499-1.
       - c. COLLECTOR TO EMITTER SATURATION RESISTANCE ($R_{CE(SAT)}$), OR SATURATION VOLTAGE ($V_{CE(SAT)}$).
       - d. STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE} AT I_C = 5 AMPS FOR 1010499-1, AT I_C = 3 AMPS FOR 1010499-2.
   - F. THE DATA SHALL BE PRESENTED IN SUCH A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE TEST READINGS. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS.
   - G. UNITS FAILING TO MEET THE INITIAL DRAWING REQUIREMENTS OF TABLES II OR III AND THE FOLLOWING POST BURN-IN ACCEPTANCE CRITERIA SHALL NOT BE ACCEPTABLE.
     - (1) STATIC FORWARD CURRENT TRANSFER RATIO, h_{fe} SHALL NOT CHANGE MORE THAN ±5% AS CALCULATED FROM THE 120-240 HOUR READINGS.
     - (2) COLLECTOR CUTOFF CURRENT, I_{CBO}, V_{CB} = 120 VDC SHALL NOT CHANGE MORE THAN FIVE TIMES (5X) OR SHOW AN ABSOLUTE INCREASE OF MORE THAN 20μA AS CALCULATED FROM THE 120-240 HOUR READINGS FOR BOTH CASES. DEVICES WITH INITIAL LEAKAGES LESS THAN 1 NANOAMP MAY INCREASE TO 5.0 NANOAMPS.
     - (3) SATURATION RESISTANCE $R_{CE(SAT)}$), OR SATURATION VOLTAGE ($V_{CE(SAT)}$), SHALL NOT CHANGE MORE THAN ±10% OR THE EQUIVALENT OF .01 OHMS, WHICHEVER IS GREATER, AS CALCULATED FROM THE 120-240 HOUR READINGS.

NOTES:
1. SURFACE A SHALL BE FLAT WITHIN .002 IN./IN. AFTER PLATING, EXCLUDING STUD UNDERCUT.
2. HEAT SINK (ALUMINUM PLATE OR EQUIVALENT) OR PULSE TESTING AT 300±30 μSEC, 2% DUTY CYCLE, REQUIRED DURING ALL ELECTRICAL TESTS.

MOUNTING TORQUE FOR TESTING: 11±1 IN-LBS.

MASTER

Ⓑ REPLACES REV A WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

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SCALE
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NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

E 1010499

REVISIONS 02196

SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02756	8/21/63	
C	REVISED PER TDRR 06246		WK
D	REVISED PER TDRR 18758	5/11/65	WK
E	REVISED PER TDRR 22043	9/14	

TABLE I

MANUFACTURER'S ABSOLUTE MAXIMUM RATINGS TC=25°C

ND	COLLECTOR VOLTAGE (V_{CB})	EMITTER VOLTAGE (V_{EB})	COLLECTOR VOLTAGE (V_{CER})	COLLECTOR CURRENT I_C	COLLECTOR POWER DISSIPATION	EIA TYPE DESIGNATION (FOR REF)
	V_{DC}	V_{DC}	V_{DC}	A_{DC}	W	
1010499-1	150	8	100	5	40	2N2634
-2	150	8	100	5	40	

TABLE II

ELECTRICIAL CHARACTERISTICS AT T_C = +25°C (SEE NOTE 2)

ND	PARAMETER	CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	LIMITS UNITS
1010499-1	DC PULSED FORWARD - CURRENT TRANSFER RATIO (PULSE LENGTH ≦ 330 uSEC, DUTY CYCLE ≦ 2%)	I_C = 1A, V_{CE} =2V	h_{FE}	40	120	—
		I_C = 10MA, V_{CE}=2V	h_{FE}	30	—	—
		I_C = 5A, V_{CE} = 5V	h_{FE}	15	—	—
	SATURATION VOLTAGE	I_C=1A, I_B=0.1A	($V_{CE(SAT)}$	—	.25	VDC
		I_C=5A, I_B=0.5A	($V_{CE(SAT)}$	—	2.0	VDC
	COLLECTOR CUTOFF CURRENT	V_{CB}=50V, I_B=0	I_{CEO}	—	100	uADC
		V_{CB}=60V, I_E=0	I_{CBO}	—	0.1	uADC
	EMITTER CUTOFF CURRENT	V_{EB}=8V, I_C=0	I_{EBO}	—	10	uADC
		V_{EB}=5V, I_C=0	I_{EBO}	—	0.1	uADC
	SWITCHBACK VOLTAGE	I_C=100MA, I_B=0	LV_{CEO}	90	—	VDC

TABLE III

(SEE NOTE 2) ELECTRICAL CHARACTERISTICS AT TC-25°C (UNLESS OTHERWISE SPECIFIED)

ND	PARAMETER	CONDITIONS	SYMBOL	SPECIFICATION LIMITS MIN	AVG	MAX	UNITS
1010499-2	SWITCHBACK VOLTAGE	I_{CE}=100MA, I_B=0	LV_{CEO}	90	-	-	VDC
	EMITTER CUTOFF CURRENT	V_{EB}=5VDC, I_C=0	I_{EBO}	—		100	µADC
	STATIC FORWARD CURRENT TRANSFER RATIO	V_{CE}=0.6±10%V, I_C=3AMPS	h_{FE}	10	-	30	-
	COLLECTOR CUTOFF CURRENT	V_{CB}=60VDC, I_E=0	I_{CBO}	-		2.0	µADC
		V_{CB}=120VDC, I_E=0	I_{CBO}	-		20	µADC
		V_{CE}=80VDC, R=10Ω, T_A=25±1°C	I_{CER}	-	-	100	µADC
	SATURATION RESISTANCE	I_B=0.3A, I_C=3A	R_{CE} (SAT)	-	-	0.15	OHMS
	BASE VOLTAGE	I_C=3A, V_{CE}=0.6±10% VDC	V_{BE}	0.8	-	1.2	VOLTS

Ⓑ REPLACES REV A WITH CHANGE

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010499
SCALE
WT
SHEET 3 OF 3

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NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010499 F

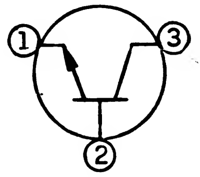
REVISIONS 02196

SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02756	8/21/63	
C	REVISED PER TDRR 06246	2-18-64	WK
D	REVISED PER TDRR 18758	5/11/65	WK
E	REVISED PER TDRR 22043	9/14	MGM
F	REVISED PER TDRR 23031	10/18/65	WK

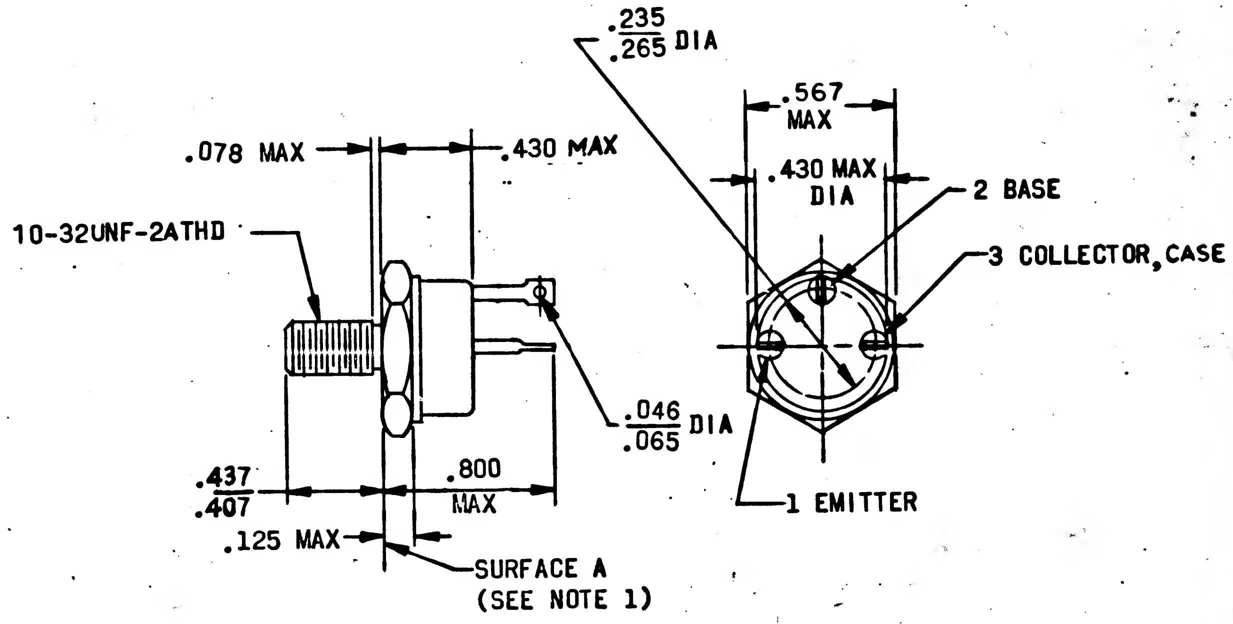
REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS OF ND 1015404, CLASS 2.
   - C. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002051
   - D. PRESERVATION, PACKING, PACKAGING AND CONTAINER MARKING PER ND 1002215 CLASS I, CODE 2.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MARKING: THE NASA DRAWING NUMBER WHICH SHALL CONSIST OF AT LEAST THE LAST THREE DIGITS; DASH NUMBER ; THE MANUFACTURER'S NAME, TRADEMARK OR CODE; DATE CODE; LOT CODE; AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND-1002019.
     - (2) TERMINAL DATA: GOLD FLASH OVER KOVAR
     - (3) MECHANICAL DIMENSIONS PER OUTLINE SHOWN.
   - B. ELECTRIC REQUIREMENTS: PER TABLE II OR III.
     - (1) STATIC FORWARD CURRENT TRANSFER RATIO (h_{FE})
     - (2) EMITTER CUTOFF CURRENT (I_{EBO})
     - (3) COLLECTOR CUTOFF CURRENT (I_{CER})
     - (4) SWITCHBACK VOLTAGE (LV_{CEO})
     - (5) SATURATION RESISTANCE ($R_{CE(SAT)}$)
     - (6) BASE TO EMITTER VOLTAGE (V_{BE}).



GRAPHICAL SYMBOL



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Ⓑ REPLACES REV (A) WITH CHANGE

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MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

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SHEET 1 OF 3

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REVISIONS 02/96			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02756	8/21/63	
C	REVISED PER TDRR 06246	2-18-64	WH
D	REVISED PER TDRR 18758	5/11/65	WH
E	REVISED PER TDRR 22043	9/14	
F	REVISED PER TDRR 23031	10/14/66	WR

3. DESIGN REQUIREMENTS:
   - A. STORAGE AND OPERATING JUNCTION TEMPERATURE: -65°C TO +175°C
   - B. THERMAL RESISTANCE (JUNCTION TO STUD): 2.50° C/WATT MAX
   - C. APPLIED TORQUE: UNITS SHALL BE DESIGNED TO WITHSTAND A MINIMUM OF 15 IN-LBS MOUNTING TORQUE.
   - D. ELECTRICAL RATING: PER TABLE I
   - E. ELECTRICAL SPECIFICATIONS: PER TABLE II OR III
   - F. LIFE TEST CONDITIONS FOR ND 1002051 SAME AS BURN-IN CONDITIONS.

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. HELIUM LEAK TEST: PER ND 1002051
   - B. GROSS LEAK TEST: PER ND 1002051
   - C. HIGH TEMPERATURE STORAGE: PER ND 1002051 EXCEPT T_A = 175°C AND TIME = 300 HOURS.
   - D. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
     - (1) STUD TEMPERATURE: 100°C
     - (2) V_{CB} = 13 VDC MINIMUM
     - (3) Pdis = 7 WATTS
   - E. THE MANUFACTURE SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO, AT 120 HOURS, AND
     - (1) FOLLOWING BURN-IN:
       - a. EMITTER CUTOFF CURRENT, I_{EBO} AT V_{EB} = 5 VDC.
       - b. COLLECTOR CUTOFF CURRENT, I_{CBO} AT V_{CB} = 120 VDC. FOR 1010499-2, 60 VDC FOR 1010499-1.
       - c. COLLECTOR TO EMITTER SATURATION RESISTANCE ($R_{CE(SAT)}$), OR SATURATION VOLTAGE ($V_{CE(SAT)}$).
       - d. STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE} AT I_C = 5 AMPS FOR 1010499-1, AT I_C = 3 AMPS FOR 1010499-2.
   - F. THE DATA SHALL BE PRESENTED IN SUCH A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE TEST READINGS. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS.
   - G. UNITS FAILING TO MEET THE INITIAL DRAWING REQUIREMENTS OF TABLES II OR III AND THE FOLLOWING POST BURN-IN ACCEPTANCE CRITERIA SHALL NOT BE ACCEPTABLE.
     - (1) STATIC FORWARD CURRENT TRANSFER RATIO, h_{fe} SHALL NOT CHANGE MORE THAN ±5% AS CALCULATED FROM THE 120-240 HOUR READINGS.
     - (2) COLLECTOR CUTOFF CURRENT, I_{CBO}, V_{CB} = 120 VDC SHALL NOT CHANGE MORE THAN FIVE TIMES (5X) OR SHOW AN ABSOLUTE INCREASE OF MORE THAN 20µA AS CALCULATED FROM THE 120-240 HOUR READINGS FOR BOTH CASES. DEVICES WITH INITIAL LEAKAGES LESS THAN 1 NANOAMP MAY INCREASE TO 5.0 NANOAMPS.
     - (3) SATURATION RESISTANCE $R_{CE(SAT)}$), OR SATURATION VOLTAGE ($V_{CE(SAT)}$), SHALL NOT CHANGE MORE THAN ±10% OR THE EQUIVALENT OF .01 OHMS, WHICHEVER IS GREATER, AS CALCULATED FROM THE 120-240 HOUR READINGS.

NOTES:
1. SURFACE A SHALL BE FLAT WITHIN .002 IN./IN. AFTER PLATING, EXCLUDING STUD UNDERCUT.
2. HEAT SINK (ALUMINUM PLATE OR EQUIVALENT) OR PULSE TESTING AT 300±30 µSEC, 2% DUTY CYCLE, REQUIRED DURING ALL ELECTRICAL TESTS.

MOUNTING TORQUE FOR TESTING: 11±1 IN-LBS.

MASTER

Ⓑ **REPLACES REV A WITH CHANGE**

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1010499 F

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E	REVISED PER TDRR 22043	9/14	
F	REVISED PER TDRR 23031	10/15/65	WK

TABLE I

MANUFACTURER'S ABSOLUTE MAXIMUM RATINGS TC=25°C

ND	COLLECTOR VOLTAGE (V_{CB})	EMITTER VOLTAGE (V_{EB})	COLLECTOR VOLTAGE (V_{CER})	COLLECTOR CURRENT I_C	COLLECTOR POWER DISSIPATION	EIA TYPE DESIGNATION (FOR REF)
	V_{DC}	V_{DC}	V_{DC}	A_{DC}	W	
1010499-1	150	8	100	5	40	2N2634
-2	150	8	100	5	40	

TABLE II

ELECTRICIAL CHARACTERISTICS AT T_C = +25°C (SEE NOTE 2)

ND	PARAMETER	CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	LIMITS UNITS
1010499-1	DC PULSED FORWARD - CURRENT TRANSFER RATIO (PULSE LENGTH ≦ 330 uSEC, DUTY CYCLE ≦ 2%)	I_C = 1A, V_{CE} =2V	h_{FE}	40	120	—
		I_C = 10MA, V_{CE}=2V	h_{FE}	30	—	—
		I_C = 5A, V_{CE} = 5V	h_{FE}	15	—	—
	SATURATION VOLTAGE	I_C=1A, I_B=0.1A	($V_{CE(SAT)}$	—	.25	VDC
		I_C=5A, I_B=0.5A	($V_{CE(SAT)}$	—	2.0	VDC
	COLLECTOR CUTOFF CURRENT	V_{CB}=50V, I_B=0	I_{CEO}	—	100	uADC
		V_{CB}=60V, I_E=0	I_{CBO}	—	0.1	uADC
	EMITTER CUTOFF CURRENT	V_{ER}=8V, I_C=0	I_{EBO}	—	10	uADC
		V_{EB}=5V, I_C=0	I_{EBO}	—	0.1	uADC
	SWITCHBACK VOLTAGE	I_C=100MA, I_B=0	LV_{CEO}	90	—	VDC

TABLE III

(SEE NOTE 2) ELECTRICAL CHARACTERISTICS AT TC-25°C (UNLESS OTHERWISE SPECIFIED)

ND	PARAMETER	CONDITIONS	SYMBOL	SPECIFICATION LIMITS MIN	AVG	MAX	UNITS
1010499-2	SWITCHBACK VOLTAGE	I_{CE}=100MA, I_B=0	LV_{CEO}	90	-	-	VDC
	EMITTER CUTOFF CURRENT	V_{EB}=5VDC, I_C=0	I_{EBO}	—		100	μADC
	STATIC FORWARD CURRENT TRANSFER RATIO	V_{CE}=0.6±10%V, I_C=3AMPS	h_{FE}	10	-	30	-
	COLLECTOR CUTOFF CURRENT	V_{CB}=60VDC, I_E=0	I_{CBO}	-		2.0	μADC
		V_{CB}=120VDC, I_E=0	I_{CBO}	-		20	μADC
		V_{CE}=80VDC, R=10Ω, T_A=25±1°C	I_{CER}	-	-	100	μADC
	SATURATION RESISTANCE	I_B=0.3A, I_C=3A	R_{CE} (SAT)	-	-	0.15	OHMS
	BASE VOLTAGE	I_C=3A, V_{CE}=0.6±10% VDC	V_{BE}	0.8	-	1.2	VOLTS

Ⓑ REPLACES REV A WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
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MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
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NASA APPROVAL 8-21-63
MIT APPROVAL 8/21/63

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TRANSISTOR
NPN, SILICON, STUD MOUNTED

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010499
SCALE NONE
WT
SHEET 3 OF 3

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

—	1010499

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS B PER TDRR 02/96	7/24/63	

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS IN MIL-D-70327.

SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS OF NS 1015404, CLASS 2 .

UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002051 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-P-19491 LEVEL A.

UNITS SHALL BE IN ACCORDANCE WITH MIL-S-19500 IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN.

INSPECTION AND ACCEPTANCE:

MECHANICAL REQUIREMENTS:

MARKING: THE NASA PART NUMBER AND REVISION LETTER, AND THE MANUFACTURER'S NAME, TRADEMARK OR CODE; DATE CODE; LOT CODE, AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART, PER MIL-STD-130. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-P-19491 AND SHALL INCLUDE THE NASA PART NUMBER AND REVISION LETTER.

TERMINAL DATA: GOLD FLASH OVER KOVAR

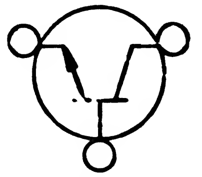
MOUNTING HARDWARE: THE FOLLOWING MOUNTING HARDWARE SHALL BE SUPPLIED WITH EACH UNIT:

- ONE - STEEL WASHER, NICKEL PLATED .200 ± .010 ID X .400 ± .010 OD X .040 ± .010 THICK
- ONE - HEX NUT, (AMERICAN STD) #10-32 NF2B DOUBLE CHAMFERED, NICKEL PLATED
- ONE - INTERNAL TOOTH LOCK WASHER #10 (3/8 OD) NICKEL PLATED
- ONE - SHOULDER WASHER, INSULATING .200 ± .010 ID X .370 ± .010 OD X 1/16" HIGH.
- ONE - INSULATING WASHER - MICA .200 ± .010 ID X .620 ± .010 OD X .003 ± .001 THICK

MECHANICAL DIMENSIONS PER OUTLINE SHOWN

ELECTRICAL REQUIREMENTS: PER TABLE II OR III

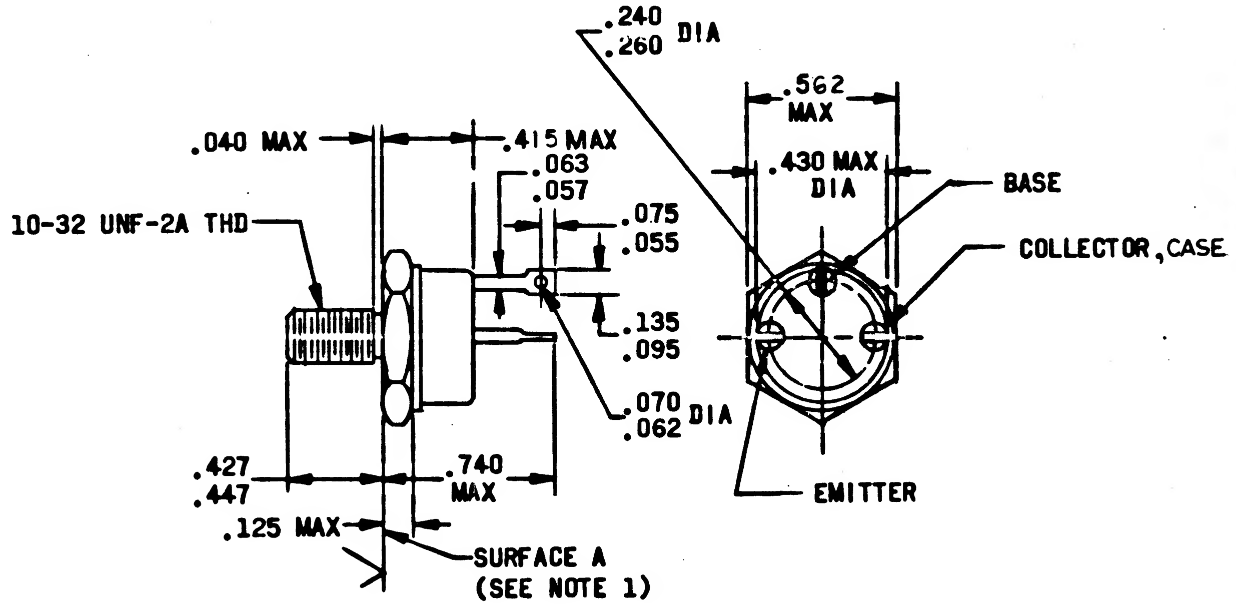
- STATIC FORWARD CURRENT TRANSFER RATIO (h_{FE})
- EMITTER CUTOFF CURRENT (I_{EBO})
- COLLECTOR CUTOFF CURRENT (I_{CER})
- SWITCHBACK VOLTAGE (LV_{CEO})
- SATURATION RESISTANCE ($R_{CE(SAT)}$)
- BASE TO EMITTER VOLTAGE (V_{BE})



GRAPHICAL SYMBOL

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 02/96 DATE 7/24/63



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SHEET 1	SHEET 2	SHEET 3
REVISION STATUS OF SHEETS		

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

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APPLICATION

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TOLERANCES ON
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DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

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DWG. NO. CONTRACT NAS9-497
DRAWN DATE 12-JUN 63
CHECKED Wilson 19 Jun 63
APPROVAL G. BLECK 6/25/63 J. HEPP/C.D. 6/25/63
APPROVAL 7/22/63
NASA APPROVAL
MIT APPROVAL 7/24/63

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NPN, SILICON, STUD MOUNTED

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1010499
SCALE NONE | WT | SHEET 1 OF 3

INCHES
0 1 2
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— 1010499

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS B PER TDRR 02196	7/24/63	WK

DESIGN REQUIREMENTS:
STORAGE TEMPERATURE: -65°C TO 175°C
THERMAL RESISTANCE (JUNCTION TO STUD): 3.75°C/WATT MAX
APPLIED TORQUE: UNITS SHALL BE DESIGNED TO WITHSTAND A MINIMUM OF 16 IN-LBS MOUNTING TORQUE.
ELECTRICAL RATING: PER TABLE I
ELECTRICAL SPECIFICATIONS: PER TABLE II OR III
LIFE TEST CONDITIONS FOR ND 1002051 SAME AS BURN-IN CONDITIONS.

SPECIAL CONDITIONING BY SUPPLIER:
HELIUM LEAK TEST: PER ND 1002051
GROSS LEAK TEST: PER ND 1002051
HIGH TEMPERATURE STORAGE: PER ND 1002051 EXCEPT T_A = 175°C AND TIME = 300 HOURS.
BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
STUD TEMPERATURE: $55\,^{+10}_{-0}$°C
V_{CE} = 13.0
I_C = 1.0 AMP
THE MANUFACTURE SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO, AT 120 HOURS, AND FOLLOWING BURN-IN:
a. EMITTER CUTOFF CURRENT, I_{EBO}
b. COLLECTOR CUTOFF CURRENT, I_{CBO} AT V_{CE} = 120 VDC
c. COLLECTOR TO EMITTER SATURATION RESISTANCE ($R_{CE(SAT)}$)
d. STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE}
THE DATA SHALL BE PRESENTED IN SUCH A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE TEST READINGS. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS.
HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF:
THE 240 HOUR READINGS OF CHARACTERISTICS a,b,c,d.
THE PERCENT CHANGE OF CHARACTERISTICS a,b,c,d AS CALCULATED FROM THE 120-240 HOUR READINGS.
UNITS FAILING TO MEET THE INITIAL DRAWING REQUIREMENTS OF TABLES I AND II OR THE FOLLOWING POST BURN-IN ACCEPTANCE CRITERIA SHALL NOT BE ACCEPTABLE.
STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE}, SHALL NOT CHANGE MORE THAN ±5% AS CALCULATED FROM THE 120-240 HOUR READINGS.
COLLECTOR CUTOFF CURRENT, I_{CBO}, V_{CE} = 120 VDC SHALL NOT CHANGE MORE THAN TWICE (2X) AS CALCULATED FROM 0-240 HOURS, OR SHOW AN ABSOLUTE INCREASE OF MORE THAN 0.5 MA AS CALCULATED FROM THE 120-240 HOUR READINGS.
SATURATION RESISTANCE $R_{CE(SAT)}$), SHALL NOT CHANGE MORE THAN ±5% AS CALCULATED FROM THE 120-240 HOUR READINGS.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 02196 **DATE** 7/24/63

NOTES:
1. SURFACE A SHALL BE FLAT WITHIN .001 IN/IN. AFTER PLATING.
2. HEAT SINK (ALUMINUM PLATE OR EQUIVALENT) REQUIRED DURING ALL ELECTRICAL TESTS. MAXIMUM JUNCTION TEMPERATURE SHALL NOT EXCEED STORAGE TEMPERATURE. MOUNTING TORQUE FOR TESTING: 11 ± 1 IN-LBS.
3. TO BE SPECIFIED BY MANUFACTURER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
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DWG. NO. CONTRACT NAS9-497
DRAWN Weissert DATE 12-JUN 63
CHECKED Wilson 19 June 63
APPROVAL G. BLECK 6/25/63 J. HEPP/C.D. 6/25/63
APPROVAL D.R. Test 7/22/63
NASA APPROVAL 7/24/63
MIT APPROVAL 24 July 63

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TRANSISTOR
NPN, SILICON, STUD MOUNTED
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SIZE C
NASA DRAWING NO. 1010499
SCALE
WT
SHEET 2 OF 3

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SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS B PER TDRR 02196	7/24/63	WK

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 02196 DATE 7/24/63

TABLE I

MANUFACTURER'S ABSOLUTE MAXIMUM RATINGS TC=25°C

ND	COLLECTOR VOLTAGE (V_{CB})	EMITTER VOLTAGE (V_{EB})	COLLECTOR VOLTAGE (V_{CE})	COLLECTOR CURRENT I_C	COLLECTOR POWER DISSIPATION	EIA TYPE DESIGNATION (FOR REF)	MINNEAPOLIS-HONEYWELL TYPE
	V_{DC}	V_{DC}	V_{DC}	A_{DC}	W		
1010499-1	150	8	100	5	40	2N2634	
-2	120	8	80	5	40		MHT6004

TABLE II

ELECTRICIAL CHARACTERISTICS AT T_C = +25°C

ND	PARAMETER	CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	LIMITS UNITS
1010499-1	DC PULSED FORWARD - CURRENT TRANSFER RATIO (PULSE LENGTH ≦ 330 uSEC, DUTY CYCLE ≦ 2%)	I_C = 1A, V_{CE} =2V	h_{FE}	40	120	—
		I_C = 10MA, V_{CE}=2V	h_{FE}	30	—	—
		I_C = 5A, V_{CE} = 5V	h_{FE}	15	—	—
	SATURATION VOLTAGE	I_C=1A, I_B=0.1A	($V_{CE(SAT)}$	—	.25	VDC
		I_C=5A, I_B=0.5A	($V_{CE(SAT)}$	—	2.0	VDC
	COLLECTOR CUTOFF CURRENT	V_{CE}=50V, I_B=0	I_{CEO}	—	100	uADC
		V_{CB}=60V, I_E=0	I_{CBO}	—	0.1	uADC
	EMITTER CUTOFF CURRENT	V_{EB}=8V, I_C=0	I_{EBO}	—	10	uADC
		V_{EB}=5V, I_C=0	I_{EBO}	—	0.1	uADC
	SWITCHBACK VOLTAGE	SEE NOTE 3	LV_{CEO}	SEE NOTE 3	—	VDC

TABLE III

(SEE NOTE 2) ELECTRICAL CHARACTERISTICS AT TC=25°C (UNLESS OTHERWISE SPECIFIED)

ND	PARAMETER	CONDITIONS	SYMBOL	SPECIFICATION LIMITS MIN	AVG	MAX	UNITS
1010499-2	SWITCHBACK VOLTAGE	I_{CE}=100MA, I_B=0	LV_{CEO}	100	-	-	VDC
	EMITTER CUTOFF CURRENT	V_{EB}=5VDC, I_C=0	I_{EBO}	—	—	1.00	MADC
	STATIC FORWARD CURRENT TRANSFER RATIO	V_{CE}=0.6±10%V, I_C=3AMPS	h_{FE}	15	-	25	-
	COLLECTOR CUTOFF CURRENT	V_{CB}=60VDC, I_E=0	I_{CBO}	-		2.0	MADC
		V_{CB}=120VDC, I_E=0	I_{CBO}	-		2.0	MADC
		V_{CE}=60VDC, R=10 Ω, T_A=25±1°C	I_{CER}	-	-	3.0	MADC
	SATURATION RESISTANCE	I_B=0.3A, I_C=3A	R_{CE} (SAT)	-	-	0.15	OHMS
	BASE VOLTAGE	I_C=3A, V_{CE}=0.6±10% VDC	V_{BE}	1.0	-	1.2	VOLTS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

HEAT TREATMENT

FINAL FINISH

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DWG NO
CONTRACT NAS9-497

DRAWN Wenzel DATE 12 JUN 63
CHECKED Wilson 19 June 63
APPROVAL G. BLECK 6/25/63 J. HEFF/C.D 6/25/63
APPROVAL D. R. Test 7/22/63
NASA APPROVAL 7/24/63
MIT APPROVAL 2 Jul 63

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SPECIFICATION CONTROL DRAWING

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SIZE C
NASA DRAWING NO. 1010499
SCALE
WT
SHEET 3 OF 3

INCHES
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—	0090101

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02603	8/14/63	

REQUIREMENTS:

GENERAL:

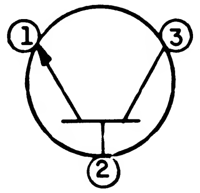
INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.

UNITS SHALL BE CAPABLE OF MEETING ALL THE QUALIFICATION REQUIREMENTS OF ND 1002051, UNLESS MODIFIED OR AMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-P-19491 LEVEL A.

UNITS SHALL BE IN ACCORDANCE WITH MIL-S-19500 IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN.



INSPECTION AND ACCEPTANCE:

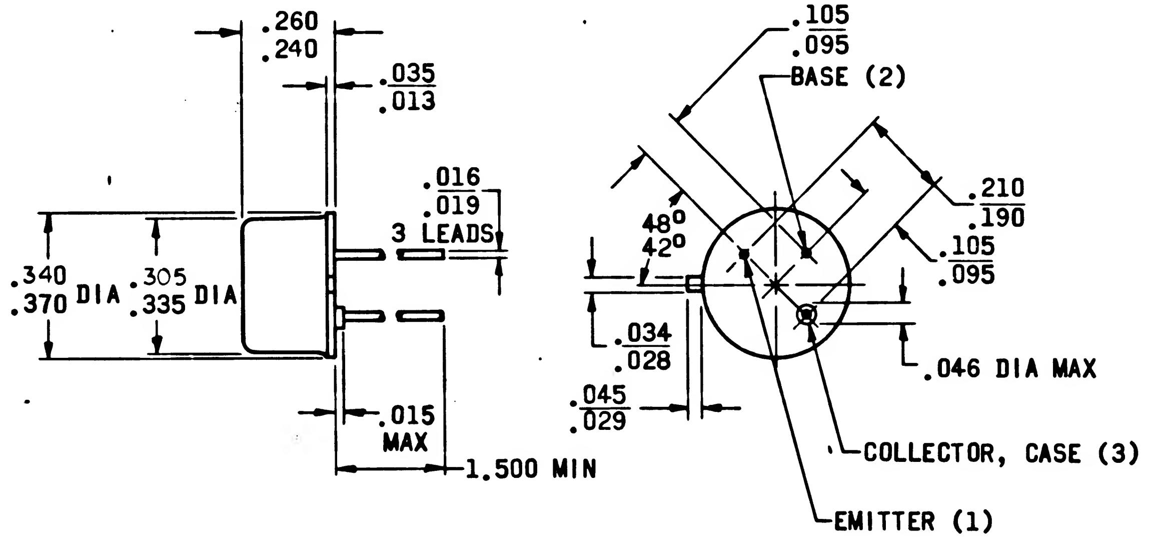
MECHANICAL REQUIREMENTS:

LEAD DATA: KOVAR WITH GOLD PLATING PER ND 1015402. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.

MARKING: THE NASA DRAWING NUMBER AND REVISION LETTER, AND THE MANUFACTURER'S NAME, TRADEMARK OR CODE; DATE CODE; LOT CODE AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER MIL-STD-130. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-P-19491 AND SHALL INCLUDE THE NASA DRAWING NUMBER AND REVISION LETTER. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

ELECTRICAL REQUIREMENTS: PER TABLE II

- COLLECTOR CUTOFF CURRENT (I_{CBO}) AT 100°C
- SWITCHBACK VOLTAGE (LV_{CER})
- FORWARD CURRENT TRANSFER RATIO (h_{FE})
- BASE SATURATION VOLTAGE ($V_{BE(SAT)}$)
- COLLECTOR SATURATION VOLTAGE ($V_{CE(SAT)}$)



DESIGN REQUIREMENTS:

ELECTRICAL RATING: PER TABLE I

ELECTRICAL CHARACTERISTICS: PER TABLE II

STORAGE TEMPERATURE: -65°C TO +200°C

POWER DISSIPATION:

AT 100°C CASE TEMPERATURE: 4.0 WATTS.

THERMAL RESISTANCE (JUNCTION-CASE): 25°C/WATT, MAXIMUM.

AT 25°C AMBIENT TEMPERATURE: 1.25 W.

THERMAL RESISTANCE (JUNCTION-AMBIENT): 140° C/WATT, MAX.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

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SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
NONE

MIT
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DWG NO
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DRAWN O.J. Foster DATE 2 AUG 63
CHECKED E.L. Hint 3 AUG 63
APPROVAL D.R. Test 14 AUG 63
APPROVAL ___
NASA APPROVAL W.J. Rhine 8-14-63
MIT APPROVAL 14 Aug 63

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NPN, SILICON)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010600
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SHEET 1 OF 2

1010600

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—	0090101

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02603	8/14/63	WK.

SPECIAL CONDITIONING BY SUPPLIER:

BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:

AMBIENT TEMPERATURE: 25° ± 5°C
COLLECTOR VOLTAGE: 30 ± 5 VOLTS DC
POWER DISSIPATION: 575 ± 57 MILLIWATTS

THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:

COLLECTOR CUTOFF CURRENT, I_{CBO1}
COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$
STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}

THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF THE ABSOLUTE VALUE OF EACH CHARACTERISTIC AND TO SHOW THE FREQUENCY DISTRIBUTION OF THE PERCENT CHANGE OF EACH CHARACTERISTIC FROM ITS INITIAL READING. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 10% IN h_{FE}, OR HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} SHALL NOT BE ACCEPTABLE. UNITS WITH INITIAL VALUES OF <1 NANOAMPERE MAY INCREASE TO 3 NANOAMPS.

NOTES:

1. PULSE MEASUREMENTS: PULSE LENGTH 300 μSEC, ± 30 μSEC, DUTY CYCLE 2%.
2. HEAT SINK (ALUMINUM PLATE OR EQUIVALENT) REQUIRED DURING ALL ELECTRICAL TESTS. MAXIMUM JUNCTION TEMPERATURE SHALL NOT EXCEED STORAGE TEMPERATURE. TC IS CASE TEMPERATURE.
3. MEASURED WITHIN 1/4 INCH OF CASE. HEAT SINK NOT REQUIRED FOR PULSE MEASUREMENTS.

TABLE I

MANUFACTURER'S ABSOLUTE MAXIMUM RATINGS T_C=+25°C			
COLLECTOR VOLTAGE (V_{CB})	EMITTER VOLTAGE (V_{EB})	COLLECTOR VOLTAGE (V_{CE})	COLLECTOR POWER DISSIPATION
VDC	VDC	VDC	W
60	5	60	7

TABLE II

ELECTRICAL CHARACTERISTICS AT T_C=+25°C ±3°C (UNLESS OTHERWISE SPECIFIED) SEE NOTE 2.					
PARAMETER	CONDITION	SYMBOL	SPECIFICATION LIMITS		
			MIN	MAX	UNITS
COLLECTOR CUTOFF CURRENT	V_{CB}=30V; I_E=0	I_{CBO1}	-	0.1	uA
	V_{CB}= 30VDC, I_E=0; TC = 100°C	I_{CBO2}	-	10	uA
SWITCHBACK VOLTAGE	I_C=10mA; R_{EB}=10Ω SEE NOTE 1.	LV_{CER}	40	-	VOLTS
COLLECTOR BREAKDOWN VOLTAGE	I_C=100uA; I_E=0	BV_{CBO}	60	-	VOLTS
EMITTER BREAKDOWN VOLTAGE	I_E=100uA; I_C=0	BV_{EBO}	5	-	VOLTS
COLLECTOR BREAKDOWN VOLTAGE	I_C=10 MA; I_B=0	BV_{CEO}	60	-	VOLTS
FORWARD CURRENT TRANSFER RATIO	V_{CE}=10V; I_C=10mA	h_{FE1}	20	-	-
	V_{CE}=4V; I_C=150mA SEE NOTE 1.	h_{FE2}	20	120	-
	V_{CE}=4V; I_C=500mA SEE NOTE 1.	h_{FE3}	15	-	-
COLLECTOR SATURATION VOLTAGE	I_C=500mA; I_B=50mA SEE NOTES 1, 3.	$V_{CE(SAT)}$	-	1.0	VOLTS
BASE SATURATION VOLTAGE	I_C=500mA; I_B=50mA SEE NOTES 1, 3.	$V_{BE(SAT)}$	-	2.0	VOLTS
OUTPUT CAPACITANCE	V_{CB}=10V; I_C=0; f=1mc	Cob	-	100	Pf
SMALL SIGNAL FORWARD CURRENT TRANSFER RATIO	V_{CE}=10V; I_C=200mA, f= 10mc	h_{fe}	4	-	-

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS9-497
DRAWN D J Foster DATE 2 AUG 63
CHECKED Flint 3 AUG 63
APPROVAL D. R. 14 AUG 63
APPROVAL
NASA APPROVAL W J Rhine 8-14-63
MIT APPROVAL 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR (MEDIUM POWER, NPN, SILICON)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010600
SCALE NONE
WT
SHEET 2 OF 2

0090101

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010602 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02740	8/21/63	
A	REVISED PER TDRR 04696	11/19/63	

REQUIREMENTS:

1. GENERAL:
   A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN SPECIFICATION ND 1015404, CLASS 3.
2. INSPECTION AND ACCEPTANCE:
   A. MARKING: TAG PERMANENTLY AND LEGIBLY WITH THE NASA PART NUMBER AND REVISION LETTER, AND THE MANUFACTURER'S NAME OR SYMBOL. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE TAG OR PACKAGE.
   B. CORE SHALL MEET THE REQUIREMENTS OF PARAGRAPH 4.0
3. DESIGN REQUIREMENTS:
   A. TYPE OF CORE CASE: ALUMINUM, OIL, FILLED HERMETICALLY SEALED.
   B. CORE: TAPE WOUND
   C. TAPE THICKNESS: 0.002"
   D. MATERIAL: SUPERMENDUR OR EQUIVALENT; PER TABLE 1
   E. CORE SIZE: (NOMINAL) O.D. = .750 I.D. = .500, HEIGHT = .125
   F. ORIENTATION: DOMAIN-ORIENTED SQUARE LOOP

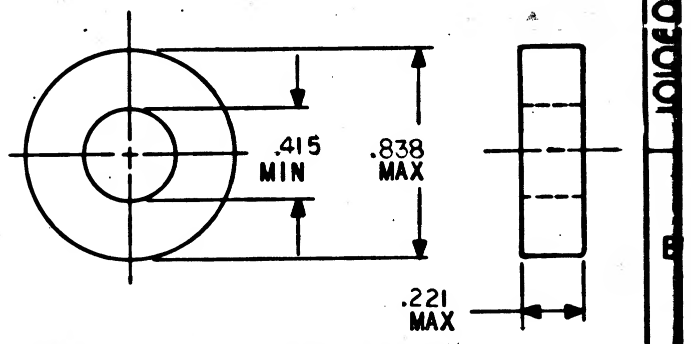
TABLE I

TYPICAL PROPERTIES OF SUPERMENDUR	
SPECIFIC GRAVITY, (GM/CC)	8.15
ELECTRICAL RESISTIVITY, (P, MICROHM-CM)	26
	400 CPS
PEAK INDUCTION, B_m, GAUSSES, MINIMUM	21,000
RESIDUAL INDUCTION, B_r, GAUSSES, MINIMUM	19,200
B_r/B_m RATIO	.92
MAXIMUM PERMEABILITY (GAUSSES/OERSTEDS)	18,000
INDUCTION AT MAXIMUM PERMEABILITY (GAUSSES)	19,000
(ALL THE ABOVE MEASUREMENTS MADE AT H_m = 3.0 OERSTEDS)	
DC PROPERTIES (H_m = 3.0 OERSTEDS)	
COERCIVE FORCE, H_c, OERSTEDS	--
CONSTANT CURRENT FLUX RESET PROPERTIES (H_m = 6.0 OERSTEDS)	
H_0, OERSTEDS (B_0 = 21,000)	0.76
H_1, OERSTEDS (B_1 = 14,000)	0.70
GAIN, GAUSSES/OERSTED	150,000 to 250,000
SINE FLUX PROPERTIES (H_m = 3.0 OERSTEDS)	
COERCIVE FORCE, H_c, OERSTEDS	0.9
SINE CURRENT PROPERTIES (H_m = 3.0 OERSTEDS)	
COERCIVE FORCE, H_c, OERSTEDS	1.5
MAXIMUM DIFFERENTIAL PERMEABILITY	
uMAX, GAUSSES/OERSTED	70,000 to 140,000

G. CORE CASE COATING: CASE TO BE COATED WITH INSULATION WHICH WILL WITHSTAND A BREAKDOWN VOLTAGE OF 1000 VRMS BETWEEN CASE AND WINDING. TEMPERATURE RATING OF INSULATION SHALL BE -55°C TO +200°C.

4.0 TEST REQUIREMENTS:

1. ALL MAGNETIC CORE PARAMETERS DESIGNATED ARE FOR SINUSOIDAL CURRENT EXCITATION AND DIRECT CURRENT RESET TESTING PER AIEE STANDARD 432
2. EXCITATION FREQUENCY 400CPS ± 10%
3. EFFECTIVE CORE AREA = 0.0857 SQ. cm. FOR TEST PURPOSES
4. $B_2 - B_1$ CORE GAIN FLUX DENSITY RANGE EQUALS 10000 GAUSSES
5. REQUIRED TEST PARAMETERS:
   A - Bm = 21.0 - 24.0 K GAUSSES
   B - $Br/_{Bm}$ = 0.92 MIN
   C. Hc MAGNETIC INTENSITY FOR Bm/2 RESET = 0.4 - 0.8 OERSTED
   D - Hr MAGNETIC INTENSITY FOR $B_2 - B_1$ RESET = 0.05 - 0.10 OERSTED



MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
NONE

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN H. J. Jacobs DATE 2 AUG 63
CHECKED WILSON 6 AUG 63
APPROVAL D. B. Stout 20 AUG 63
APPROVAL
NASA APPROVAL 8/21/63
MIT APPROVAL L Hafer 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CORE, SUPERMENDUR
(TOROIDAL)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1010602
SCALE NONE | WT | SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

-	1010602

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02746	8/21/63	

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN SPECIFICATION ND 1015404, CLASS 3.

INSPECTION AND ACCEPTANCE:

MARKING: MARK PERMANENTLY AND LEGIBLY WITH THE NASA PART NUMBER AND REVISION LETTER, AND THE MANUFACTURER'S NAME OR SYMBOL. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

CORE SHALL MEET THE REQUIREMENTS OF TABLE I.

DESIGN REQUIREMENTS:

TYPE OF CORE CASE: ALUMINUM, SILICONE GREASE FILLED

CORE: TAPE WOUND

TAPE THICKNESS: 0.002"

MATERIAL: SUPERMENDUR OR EQUIVALENT

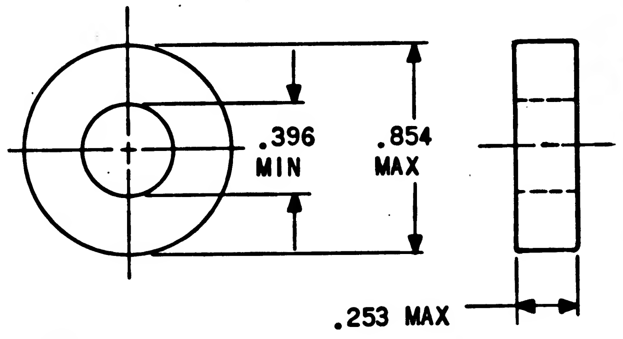
CORE SIZE: (NOMINAL) O.D. = 7.50, I.D. = .500, HEIGHT = .125

ORIENTATION: DOMAIN-ORIENTED SQUARE LOOP

TABLE I

PROPERTIES OF SUPERMENDUR

SPECIFIC GRAVITY, (GM/CC)	8.15
ELECTRICAL RESISTIVITY, (P, MICROHM-CM)	26
	400 CPS
PEAK INDUCTION, B_m, GAUSSES	21,000
RESIDUAL INDUCTION, B_r, GAUSSES	19,200
B_r/B_m RATIO	.92
MAXIMUM PERMEABILITY (GAUSSES/OERSTEDS)	18,000
INDUCTION AT MAXIMUM PERMEABILITY (GAUSSES)	19,000
(ALL THE ABOVE MEASUREMENTS MADE AT H_m = 3.0 OERSTEDS)	
DC PROPERTIES (H_m = 3.0 OERSTEDS)	
COERCIVE FORCE, H_c, OERSTEDS	--
CONSTANT CURRENT FLUX RESET PROPERTIES (H_m = 6.0 OERSTEDS)	
H_0, OERSTEDS (B_0 = 21,000)	0.76
H_1, OERSTEDS (B_1 = 14,000)	0.70
GAIN, GAUSSES/OERSTED	150,000 to 250,000
SINE FLUX PROPERTIES (H_m = 3.0 OERSTEDS)	
COERCIVE FORCE, H_c, OERSTEDS	0.9
SINE CURRENT PROPERTIES (H_m = 3.0 OERSTEDS)	
COERCIVE FORCE, H_c, OERSTEDS	1.5
MAXIMUM DIFFERENTIAL PERMEABILITY uMAX, GAUSSES/OERSTED	70,000 to 140,000



MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN D. J. Jacobs DATE 2 AUG 63
CHECKED WILSON 6 AUG 63
APPROVAL D. A. Test 20 AUG 63
APPROVAL
NASA APPROVAL 8/21/63
MIT APPROVAL L Hafel 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CORE, SUPERMENDUR
(TOROIDAL)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010602
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS. SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION. OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

A 1010604

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
=	INITIAL RELEASE CLASS A PER TDRR 02599	8/14/63	WK.
A	REVISED PER TDRR 03702	8 Oct 63	WK

REQUIREMENTS:

GENERAL:

UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF SPECIFICATION MIL-R-26 FOR INSULATED TYPE; EXCEPT AS SPECIFIED HEREIN.

UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002057 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

PACKAGING: UNITS SHALL BE PACKAGED IN ACCORDANCE WITH ND 1002129.

INSPECTION AND ACCEPTANCE

ELECTRICAL REQUIREMENTS:

RESISTANCE VALUE: PER TABLE

RESISTANCE TOLERANCE: ± 1%

MECHANICAL REQUIREMENTS:

LEADS: IRON NICKEL ALLOY COPPER CLAD GOLD PLATED PER NASA SPECIFICATION PS 1015401. A CERTIFICATE OF COMPLIANCE OF LEAD MATERIAL SHALL ACCOMPANY EACH LOT SHIPPED.

MARKING: MARK UNITS PER MIL-STD-130 WITH MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, DATE CODE

MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL INCLUDE NASA PART NUMBER AND REVISION LETTER.

DESIGN REQUIREMENTS:

PER MIL-R-26 EXCEPT AS MODIFIED BY THIS DRAWING.

POWER RATING: 1 WATT AT +25°C, DERATED PER CHART.

TEMPERATURE COEFFICIENT: ± 30 PPM/°C UP TO +275°C.

EACH LEAD SHALL BE CAPABLE OF WITHSTANDING TWO (2) BENDS UNDER A TWO (2) POUND VERTICAL PULL (LEADS VERTICAL WITH RESPECT TO UNIT BODY). TWO (2) BENDS SHALL BE ACCOMPLISHED BY MOVING THE BODY OF THE UNIT, WHILE IN THE SAME PLANE, THROUGH 90° IN ONE DIRECTION, THEN BACK 180° TO THE OPPOSITE DIRECTION, THEN BACK 90° TO THE ORIGINAL POSITION. NO MECHANICAL DAMAGE OR LACK OF PERFORMANCE SHALL BE EVIDENCED AFTER THE TEST.

MECHANICAL STRENGTH: PER MIL-R-26 EXCEPT 5 LB. MAX LOAD

SPECIAL CONDITIONING BY SUPPLIER:

BURN-IN: UNITS SHALL BE BURNED-IN FOR 100 HRS AT 25°C AND RATED WATTAGE 1-1/2 HRS ON, 1/2 HR OFF, UNITS THAT EXCEED THE INITIAL TOLERANCE OR CHANGE MORE THAN .5% SHALL BE REJECTED.

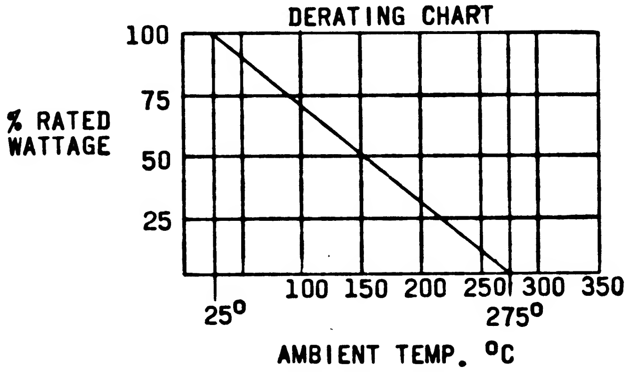
PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

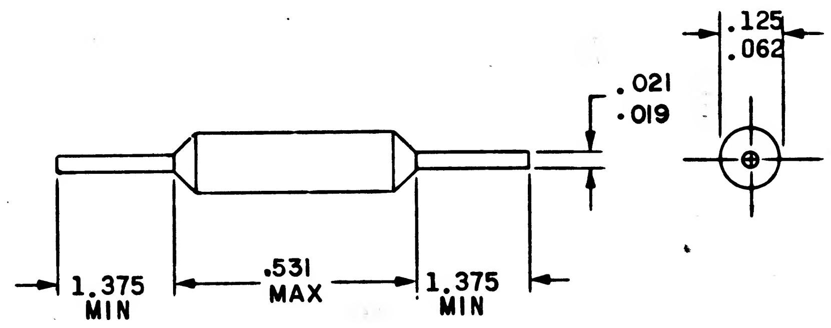
NASA PART NUMBER	RESISTANCE OHMS NOMINAL
1	600
2	610
3	620
4	630
5	640
6	650
7	660
8	670
9	680
10	690
11	700
12	710
13	720
14	730
15	740
16	750
17	760
18	770
19	780
20	790
21	800
22	1000

NASA PART NUMBER	RESISTANCE OHMS NOMINAL
23	1
24	2
25	3
26	4
27	5
28	6
29	7
30	8
31	9
32	10
33	100

THE COMPLETE PART NUMBER IS THIS DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

DERATING CHART





QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL: SEE NOTES

HEAT TREATMENT: NONE

FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS 9-497

DRAWN [illegible] DATE 24 JUL 63
CHECKED Hogue 27 JULY 63
APPROVAL [illegible] 8/13/63
APPROVAL

NASA APPROVAL W J Rhine 8-14-63

MIT APPROVAL [illegible] 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, WIREWOUND
1 WATT
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010604
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

B 1010604

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
=	INITIAL RELEASE CLASS A PER TDRR 02599	8/14/63	WK.
A	REVISED PER TDRR 03702	8 Oct 63	WK
B	REVISED PER TDRR 06773	3/10/64	RPK WK

REQUIREMENTS:

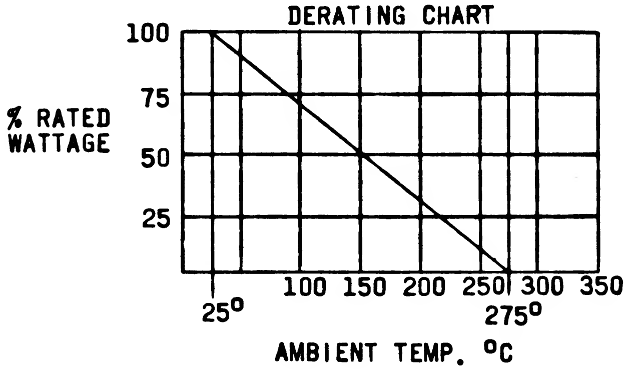
1. GENERAL:
   - A. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF SPECIFICATION MIL-R-26 FOR INSULATED TYPE; EXCEPT AS SPECIFIED HEREIN.
   - B. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002057 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - C. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - D. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - E. PACKAGING: UNITS SHALL BE PACKAGED IN ACCORDANCE WITH ND 1002129.

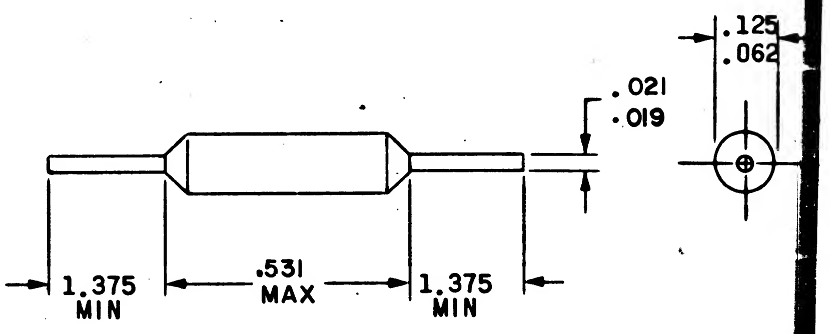
2. INSPECTION AND ACCEPTANCE
   - A. ELECTRICAL REQUIREMENTS:
     - (1) RESISTANCE VALUE: PER TABLE
     - (2) RESISTANCE TOLERANCE: ± 1%
   - B. MECHANICAL REQUIREMENTS:
     - (1) LEADS: IRON NICKEL ALLOY COPPER CLAD GOLD PLATED PER NASA SPECIFICATION PS 1015401. A CERTIFICATE OF COMPLIANCE OF LEAD MATERIAL SHALL ACCOMPANY EACH LOT SHIPPED.
     - (2) MARKING: MARK UNITS PER ND1002019 WITH MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, DATE CODE
       MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL INCLUDE NASA PART NUMBER AND REVISION LETTER, PER MIL-STD-129.

NASA PART NUMBER	RESISTANCE OHMS NOMINAL	NASA PART NUMBER	RESISTANCE OHMS NOMINAL
1	600	23	1
2	610	24	2
3	620	25	3
4	630	26	4
5	640	27	5
6	650	28	6
7	660	29	7
8	670	30	8
9	680	31	9
10	690	32	10
11	700	33	100
12	710	34	1800
13	720		
14	730		
15	740		
16	750		
17	760		
18	770		
19	780		
20	790		
21	800		
22	1000		

B. THE COMPLETE PART NUMBER IS THIS DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

3. DESIGN REQUIREMENTS:
   - A. PER MIL-R-26 EXCEPT AS MODIFIED BY THIS DRAWING.
   - B. POWER RATING: 1 WATT AT +25°C, DERATED PER CHART.
   - C. TEMPERATURE COEFFICIENT: ± 30 PPM/°C UP TO +275°C.
   - D. EACH LEAD SHALL BE CAPABLE OF WITHSTANDING TWO (2) BENDS UNDER A TWO (2) POUND VERTICAL PULL (LEADS VERTICAL WITH RESPECT TO UNIT BODY). TWO (2) BENDS SHALL BE ACCOMPLISHED BY MOVING THE BODY OF THE UNIT, WHILE IN THE SAME PLANE, THROUGH 90° IN ONE DIRECTION, THEN BACK 180° TO THE OPPOSITE DIRECTION, THEN BACK 90° TO THE ORIGINAL POSITION. NO MECHANICAL DAMAGE OR LACK OF PERFORMANCE SHALL BE EVIDENCED AFTER THE TEST.
   - E. MECHANICAL STRENGTH: PER MIL-R-26 EXCEPT 5 LB. MAX LOAD





4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. BURN-IN: UNITS SHALL BE BURNED-IN FOR 100 HRS AT 25°C AND RATED WATTAGE 1-1/2 HRS ON, 1/2 HR OFF, UNITS THAT EXCEED THE INITIAL TOLERANCE OR CHANGE MORE THAN .5% SHALL BE REJECTED.

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
	LIST OF MATERIALS	

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NUTES
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS 9-497
DRAWN D. L. Jacobs DATE 24 JUL 63
CHECKED Hogue 27 JULY 63
APPROVAL D. E. Test 8/13/63
APPROVAL
NASA APPROVAL W. J. Rhine 8-14-63
MIT APPROVAL 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, WIREWOUND
1 WATT
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010604
SCALE NONE
WT
SHEET 1 OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

C | 1010604

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
=	INITIAL RELEASE CLASS A PER TDRR 02599	8/14/63	WK.
A	REVISED PER TDRR 03702	8 Oct 63	WK
B	REVISED PER TDRR 06773	3/10/64	EPK WK
C	REVISED PER TDRR 07104	3/24/64	EPK WK

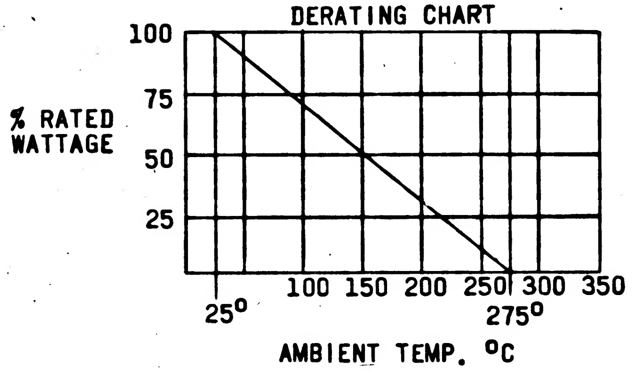
REQUIREMENTS:

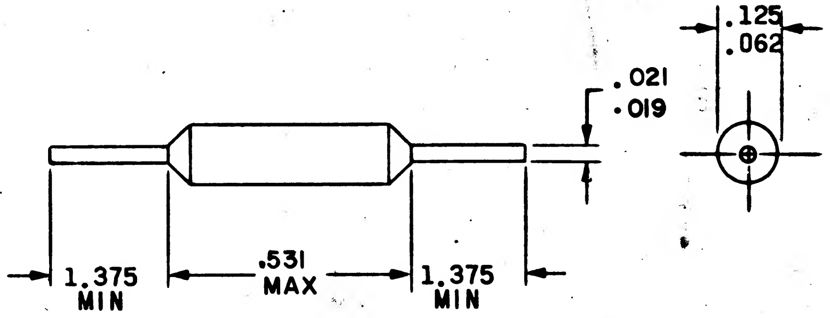
1. GENERAL:
   - A. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF SPECIFICATION MIL-R-26 FOR INSULATED TYPE; EXCEPT AS SPECIFIED HEREIN.
   - B. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002057 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - C. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - D. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - E. PACKAGING: UNITS SHALL BE PACKAGED IN ACCORDANCE WITH ND 1002129.

2. INSPECTION AND ACCEPTANCE
   - A. ELECTRICAL REQUIREMENTS:
     - (1) RESISTANCE VALUE: PER TABLE
     - (2) RESISTANCE TOLERANCE: ± 1%
   - B. MECHANICAL REQUIREMENTS:
     - (1) LEADS: IRON NICKEL ALLOY COPPER CLAD GOLD PLATED PER NASA SPECIFICATION PS 1015401. A CERTIFICATE OF COMPLIANCE OF LEAD MATERIAL SHALL ACCOMPANY EACH LOT SHIPPED.
     - (2) MARKING: MARK UNITS PER ND1002019 WITH MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, DATE CODE
       MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL INCLUDE NASA PART NUMBER AND REVISION LETTER, PER MIL-STD-129.

NASA PART NUMBER	RESISTANCE OHMS NOMINAL	NASA PART NUMBER	RESISTANCE OHMS, NOMINAL
1	600	23	1
2	610	24	2
3	620	25	3
4	630	26	4
5	640	27	5
6	650	28	6
7	660	29	7
8	670	30	8
9	680	31	9
10	690	32	10
11	700	33	100
12	710	34	1800
13	720	35	430
14	730		
15	740		
16	750		
17	760		
18	770		
19	780		
20	790		
21	800		
22	1000		

B. THE COMPLETE PART NUMBER IS THIS DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.





3. DESIGN REQUIREMENTS:
   - A. PER MIL-R-26 EXCEPT AS MODIFIED BY THIS DRAWING.
   - B. POWER RATING: 1 WATT AT +25°C, DERATED PER CHART.
   - C. TEMPERATURE COEFFICIENT: ± 30 PPM/°C UP TO +275°C.
   - D. EACH LEAD SHALL BE CAPABLE OF WITHSTANDING TWO (2) BENDS UNDER A TWO (2) POUND VERTICAL PULL (LEADS VERTICAL WITH RESPECT TO UNIT BODY). TWO (2) BENDS SHALL BE ACCOMPLISHED BY MOVING THE BODY OF THE UNIT, WHILE IN THE SAME PLANE, THROUGH 90° IN ONE DIRECTION, THEN BACK 180° TO THE OPPOSITE DIRECTION, THEN BACK 90° TO THE ORIGINAL POSITION. NO MECHANICAL DAMAGE OR LACK OF PERFORMANCE SHALL BE EVIDENCED AFTER THE TEST.
   - E. MECHANICAL STRENGTH: PER MIL-R-26 EXCEPT 5 LB. MAX LOAD

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. BURN-IN: UNITS SHALL BE BURNED-IN FOR 100 HRS AT 25°C AND RATED WATTAGE 1-1/2 HRS ON, 1/2 HR OFF, UNITS THAT EXCEED THE INITIAL TOLERANCE OR CHANGE MORE THAN .5% SHALL BE REJECTED.

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS 9-497
DRAWN D. L. Jacobs DATE 24 JUL 63
CHECKED Hoque 27 JULY 63
APPROVAL D. R. Test 8/13/63
APPROVAL
NASA APPROVAL W J Rhine 8-14-63
MIT APPROVAL W Kupfer 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, WIREWOUND
1 WATT
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010604
SCALE NONE
WT
SHEET 1 OF 1

1010604 C

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

D 1010604

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
=	INITIAL RELEASE CLASS A PER TDRR 02599	8/14/63	WK.
A	REVISED PER TDRR 03702	8 Oct 63	WK
B	REVISED PER TDRR 06773	3/10/64	EPK WK
C	REVISED PER TDRR 07104	3/24/64	EPK WK
D	REVISED PER TDRR 07314	3/31/64	EPK WK

REQUIREMENTS:

1. GENERAL:
   - A. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF SPECIFICATION MIL-R-26 FOR INSULATED TYPE; EXCEPT AS SPECIFIED HEREIN.
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   - E. PACKAGING: UNITS SHALL BE PACKAGED IN ACCORDANCE WITH ND 1002129.

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8	670	30	8
9	680	31	9
10	690	32	10
11	700	33	100
12	710	34	1800
13	720	35	430
14	730	36	0.75
15	740	37	300
16	750		
17	760		
18	770		
19	780		
20	790		
21	800		
22	1000		

B. THE COMPLETE PART NUMBER IS THIS DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

2. INSPECTION AND ACCEPTANCE
   - A. ELECTRICAL REQUIREMENTS:
     - (1) RESISTANCE VALUE: PER TABLE
     - (2) RESISTANCE TOLERANCE: ± 1%
   - B. MECHANICAL REQUIREMENTS:
     - (1) LEADS: IRON NICKEL ALLOY COPPER CLAD GOLD PLATED PER NASA SPECIFICATION PS 1015401. A CERTIFICATE OF COMPLIANCE OF LEAD MATERIAL SHALL ACCOMPANY EACH LOT SHIPPED.
     - (2) MARKING: MARK UNITS PER ND1002019 WITH MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, DATE CODE
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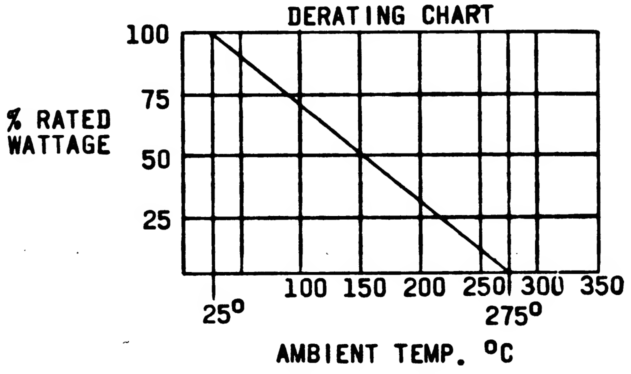

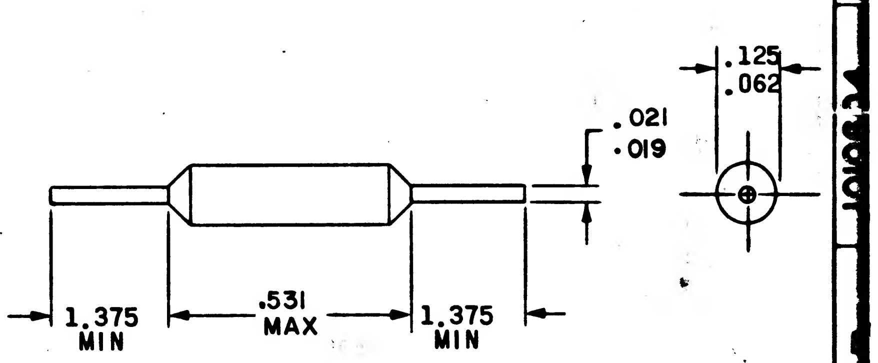

3. DESIGN REQUIREMENTS:
   - A. PER MIL-R-26 EXCEPT AS MODIFIED BY THIS DRAWING.
   - B. POWER RATING: 1 WATT AT +25°C, DERATED PER CHART.
   - C. TEMPERATURE COEFFICIENT: ± 30 PPM/°C UP TO +275°C.
   - D. EACH LEAD SHALL BE CAPABLE OF WITHSTANDING TWO (2) BENDS UNDER A TWO (2) POUND VERTICAL PULL (LEADS VERTICAL WITH RESPECT TO UNIT BODY). TWO (2) BENDS SHALL BE ACCOMPLISHED BY MOVING THE BODY OF THE UNIT, WHILE IN THE SAME PLANE, THROUGH 90° IN ONE DIRECTION, THEN BACK 180° TO THE OPPOSITE DIRECTION, THEN BACK 90° TO THE ORIGINAL POSITION. NO MECHANICAL DAMAGE OR LACK OF PERFORMANCE SHALL BE EVIDENCED AFTER THE TEST.
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PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS 9-497

DRAWN D. L. Jacobs DATE 24 JUL 63
CHECKED Hogue 27 JULY 63
APPROVAL D. R. Test 8/13/63
APPROVAL

NASA APPROVAL W. J. Rhine 8-14-63
MIT APPROVAL W. Snyder 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, WIREWOUND
1 WATT
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010604
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

E 1010604

REVISIONS

SYM	DESCRIPTION	DATE	APP
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E	REVISED PER TDRR 10810	7/7/64	W

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12	710	34	1800
13	720	35	430
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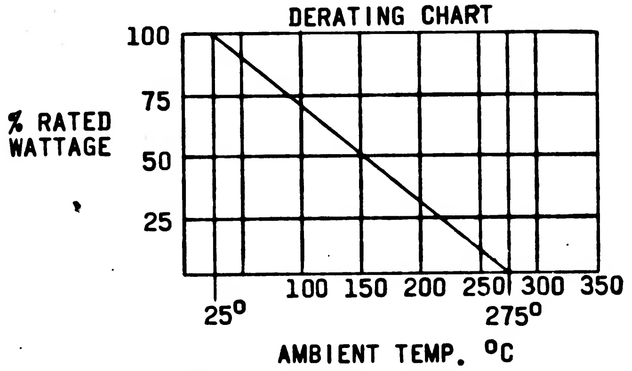
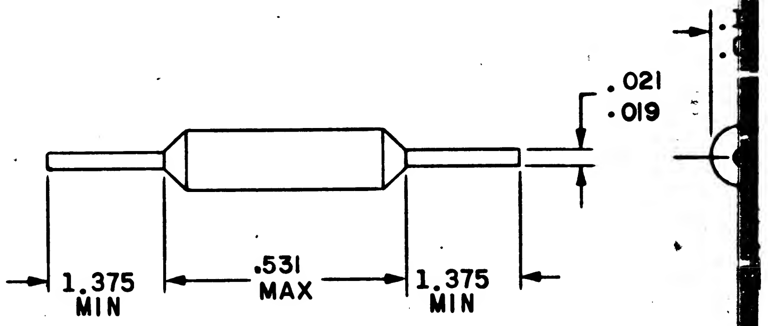
18	770		
19	780		
20	790		
21	800		
22	1000		

B. THE COMPLETE PART NUMBER IS THIS DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

DERATING CHART





QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS 9-497

DRAWN D. L. Jacobs DATE 24 JUL 63
CHECKED Hogue 27 JULY 63
APPROVAL D. G. Test 8/13/63
APPROVAL

NASA APPROVAL W J Rhine 8-14-63
MIT APPROVAL W Snyder 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, WIREWOUND
1 WATT
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010604
SCALE NONE
WT
SHEET 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

F 1010604

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
=	INITIAL RELEASE CLASS A PER TDRR 02599	8/14/63	WK.
A	REVISED PER TDRR 03702	8 Oct 63	WK
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D	REVISED PER TDRR 07314	3/31/64	EPK WK
E	REVISED PER TDRR 10810	7/7/64	WK
F	REVISED PER TDRR 10925	7/21/64	WK.

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20	790	42	20
21	800	43	22
22	1000	44	24

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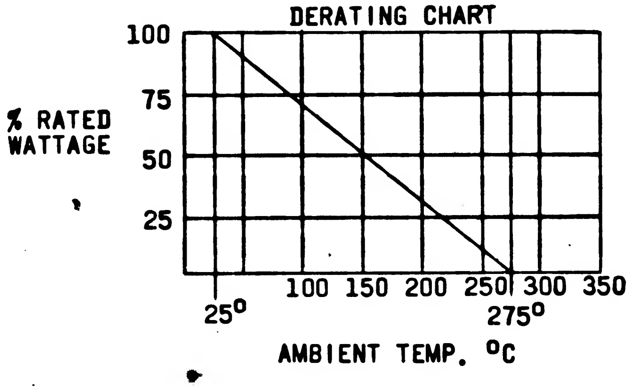
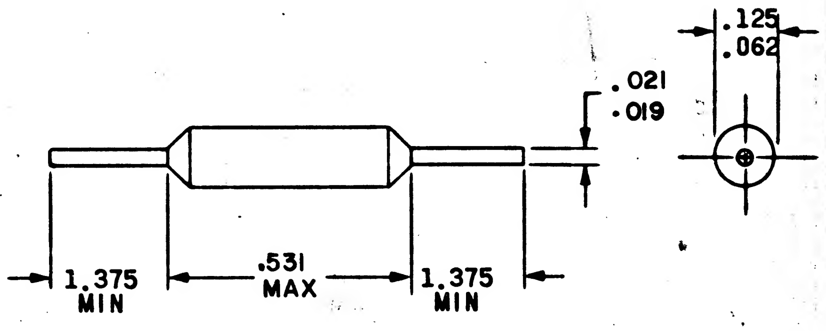
DERATING CHART





PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS 9-497
DRAWN G. L. Jacobs DATE 24 JUL 63
CHECKED Hogue 27 JULY 63
APPROVAL D. G. Hoag 8/13/63
APPROVAL
NASA APPROVAL W. J. Rhine 8-14-63
MIT APPROVAL 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, WIREWOUND
1 WATT
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010604
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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G 1010604

SYM	DESCRIPTION	DATE	APPROVAL
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D	REVISED PER TDRR 07314	3/31/64	RPK WK
E	REVISED PER TDRR 10810	7/7/64	WK
F	REVISED PER TDRR 10925	7/21/64	WK.
G	REVISED PER TDRR 11136	7/28/64	WK

REQUIREMENTS:

1. GENERAL:
   - A. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF SPECIFICATION MIL-R-26 FOR INSULATED TYPE; EXCEPT AS SPECIFIED HEREIN.
   - B. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002057 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - C. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - D. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - E. PACKAGING: UNITS SHALL BE PACKAGED IN ACCORDANCE WITH ND 1002129.

2. INSPECTION AND ACCEPTANCE
   - A. ELECTRICAL REQUIREMENTS:
     - (1) RESISTANCE VALUE: PER TABLE
     - (2) RESISTANCE TOLERANCE: ± 1%
   - B. MECHANICAL REQUIREMENTS:
     - (1) LEADS: IRON NICKEL ALLOY COPPER CLAD GOLD PLATED PER NASA SPECIFICATION PS 1015401. A CERTIFICATE OF COMPLIANCE OF LEAD MATERIAL SHALL ACCOMPANY EACH LOT SHIPPED.
     - (2) MARKING: MARK UNITS PER ND1002019 WITH MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, DATE CODE
       MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL INCLUDE NASA PART NUMBER AND REVISION LETTER, PER MIL-STD-129.

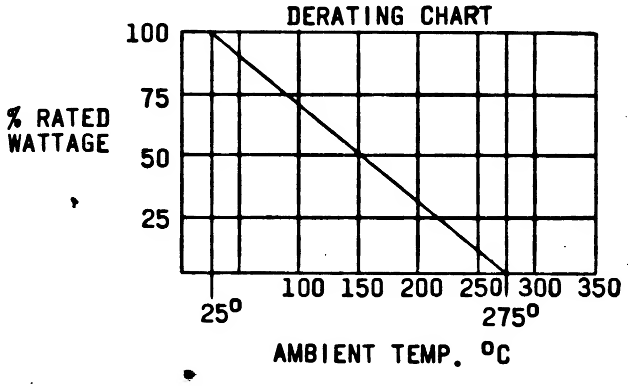
3. DESIGN REQUIREMENTS:
   - A. PER MIL-R-26 EXCEPT AS MODIFIED BY THIS DRAWING.
   - B. POWER RATING: 1 WATT AT +25°C, DERATED PER CHART.
   - C. TEMPERATURE COEFFICIENT: ± 30 PPM/°C UP TO +275°C.
   - D. EACH LEAD SHALL BE CAPABLE OF WITHSTANDING TWO (2) BENDS UNDER A TWO (2) POUND VERTICAL PULL (LEADS VERTICAL WITH RESPECT TO UNIT BODY). TWO (2) BENDS SHALL BE ACCOMPLISHED BY MOVING THE BODY OF THE UNIT, WHILE IN THE SAME PLANE, THROUGH 90° IN ONE DIRECTION, THEN BACK 180° TO THE OPPOSITE DIRECTION, THEN BACK 90° TO THE ORIGINAL POSITION. NO MECHANICAL DAMAGE OR LACK OF PERFORMANCE SHALL BE EVIDENCED AFTER THE TEST.
   - E. MECHANICAL STRENGTH: PER MIL-R-26 EXCEPT 5 LB. MAX LOAD

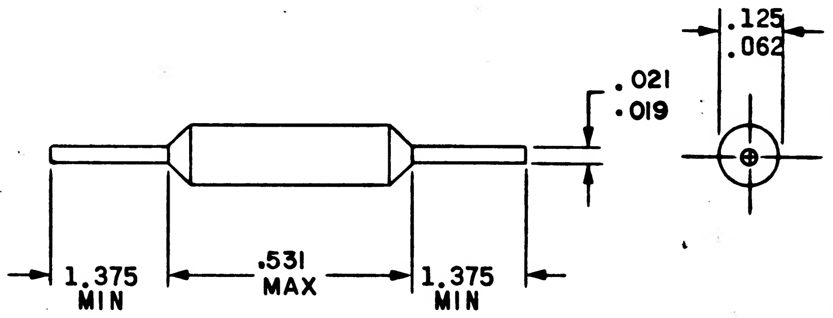
4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. BURN-IN: UNITS SHALL BE BURNED-IN FOR 100 HRS AT 25°C AND RATED WATTAGE 1-1/2 HRS ON, 1/2 HR OFF, UNITS THAT EXCEED THE INITIAL TOLERANCE OR CHANGE MORE THAN .5% SHALL BE REJECTED.

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

NASA PART NUMBER	RESISTANCE OHMS NOMINAL	NASA PART NUMBER	RESISTANCE OHMS, NOMINAL
1	600	23	1
2	610	24	2
3	620	25	3
4	630	26	4
5	640	27	5
6	650	28	6
7	660	29	7
8	670	30	8
9	680	31	9
10	690	32	10
11	700	33	100
12	710	34	1800
13	720	35	430
14	730	36	0.75
15	740	37	300
16	750	38	3300
17	760	39	2000
18	770	40	16
19	780	41	18
20	790	42	20
21	800	43	22
22	1000	44	24
		45	360

B. THE COMPLETE PART NUMBER IS THIS DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.





QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS 9-497
DRAWN G. L. Jacobe DATE 24 JUL 63
CHECKED Hogue 27 JULY 63
APPROVAL D. R. Test 8/13/63
APPROVAL
NASA APPROVAL W J Rhine 8-14-63
MIT APPROVAL 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, WIREWOUND
1 WATT
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010604
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS. SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION. OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

H | 1010604

SYM	DESCRIPTION	DATE	APPROVAL
–	INITIAL RELEASE CLASS A PER TDRR 02599	8/14/63	WK.
A	REVISED PER TDRR 03702	8 Oct 63	WK
B	REVISED PER TDRR 06773	3/10/64	EPK WK
C	REVISED PER TDRR 07104	3/24/64	EPK WK
D	REVISED PER TDRR 07314	3/31/64	EPK WK
E	REVISED PER TDRR 10810	7/7/64	WK
F	REVISED PER TDRR 10925	7/21/64	WK.
G	REVISED PER TDRR 11136	7/28/64	WK
H	REVISED PER TDRR 14481	12-1-64	WK

REQUIREMENTS:

1. GENERAL:
   - A. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF SPECIFICATION MIL-R-26 FOR INSULATED TYPE; EXCEPT AS SPECIFIED HEREIN.
   - B. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002057 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - C. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - D. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - E. PACKAGING: UNITS SHALL BE PACKAGED IN ACCORDANCE WITH ND 1002129.

2. INSPECTION AND ACCEPTANCE
   - A. ELECTRICAL REQUIREMENTS:
     - (1) RESISTANCE VALUE: PER TABLE
     - (2) RESISTANCE TOLERANCE: ± 1%
   - B. MECHANICAL REQUIREMENTS:
     - (1) LEADS: IRON NICKEL ALLOY COPPER CLAD GOLD PLATED PER NASA SPECIFICATION PS 1015401. A CERTIFICATE OF COMPLIANCE OF LEAD MATERIAL SHALL ACCOMPANY EACH LOT SHIPPED.
     - (2) MARKING: MARK UNITS PER ND1002019 WITH MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, DATE CODE
       MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL INCLUDE NASA PART NUMBER AND REVISION LETTER, PER MIL-STD-129.

3. DESIGN REQUIREMENTS:
   - A. PER MIL-R-26 EXCEPT AS MODIFIED BY THIS DRAWING.
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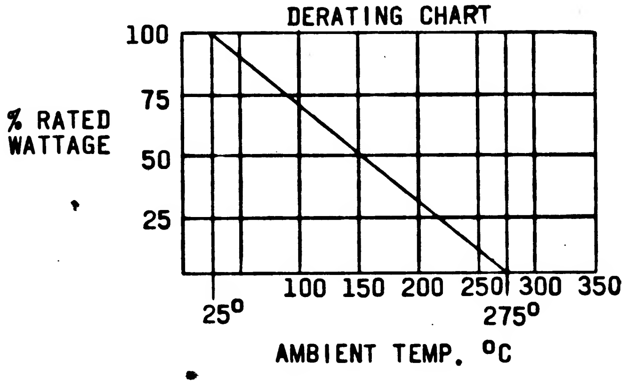
   - D. EACH LEAD SHALL BE CAPABLE OF WITHSTANDING TWO (2) BENDS UNDER A TWO (2) POUND VERTICAL PULL (LEADS VERTICAL WITH RESPECT TO UNIT BODY). TWO (2) BENDS SHALL BE ACCOMPLISHED BY MOVING THE BODY OF THE UNIT, WHILE IN THE SAME PLANE, THROUGH 90° IN ONE DIRECTION, THEN BACK 180° TO THE OPPOSITE DIRECTION, THEN BACK 90° TO THE ORIGINAL POSITION. NO MECHANICAL DAMAGE OR LACK OF PERFORMANCE SHALL BE EVIDENCED AFTER THE TEST.
   - E. MECHANICAL STRENGTH: PER MIL-R-26 EXCEPT 5 LB. MAX LOAD

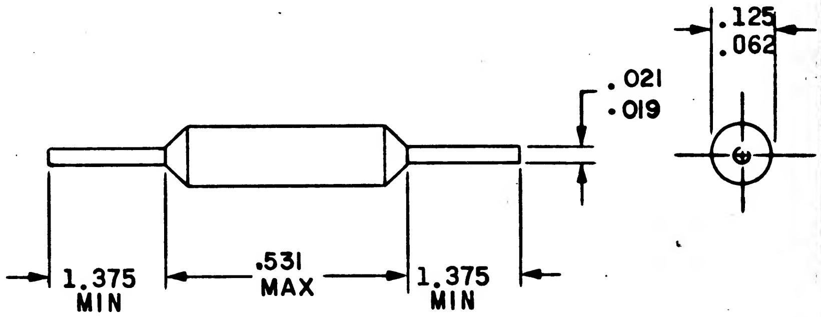
4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. BURN-IN: UNITS SHALL BE BURNED-IN FOR 100 HRS AT 25°C AND RATED WATTAGE 1-1/2 HRS ON, 1/2 HR OFF, UNITS THAT EXCEED THE INITIAL TOLERANCE OR CHANGE MORE THAN .5% SHALL BE REJECTED.

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

NASA PART NUMBER	RESISTANCE OHMS NOMINAL
1	600
2	610
3	620
4	630
5	640
6	650
7	660
8	670
9	680
10	690
11	700
12	710
13	720
14	730
15	740
16	750
17	760
18	770
19	780
20	790
21	800
22	1000
23	1
24	2
25	3
26	4
27	5
28	6
29	7
30	8
31	9
32	10
33	100
34	1800
35	430
36	0.75
37	300
38	3300
39	2000
40	16
41	18
42	20
43	22
44	24
45	360
46	510
47	1300
48	75

DERATING CHART





NEXT ASSY	USED ON
APPLICATION	

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS 9-497

DRAWN D. L. Jacobs DATE 24 JUL 63
CHECKED Hogue 27 JULY 63
APPROVAL D. E. Test 8/13/63
APPROVAL
NASA APPROVAL W J Rhine 8-14-63
MIT APPROVAL 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, WIREWOUND
1 WATT
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010604
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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J 1010604

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1	600
2	610
3	620
4	630
5	640
6	650
7	660
8	670
9	680
10	690
11	700
12	710
13	720
14	730
15	740
16	750
17	[illegible]
18	[illegible]
19	[illegible]
20	[illegible]
21	800
22	1000

NASA PART NUMBER	RESISTANCE OHMS, NOMINAL
23	1
24	2
25	3
26	4
27	5
28	6
29	7
30	8
31	9
32	10
33	100
34	1800
35	430
36	0.75
37	300
38	3300
39	2000
40	16
41	18
42	20
43	22
44	24
45	360
46	510
47	1300
48	75
49	40
50	1500

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
–	INITIAL RELEASE CLASS A PER TDRR 02599	8/14/63	WK.
A	REVISED PER TDRR 03702	8 Oct 63	WK
B	REVISED PER TDRR 06773	3/10/64	RPK WK
C	REVISED PER TDRR 07104	3/24/64	RPK WK
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E	REVISED PER TDRR 10810	7/7/64	WK
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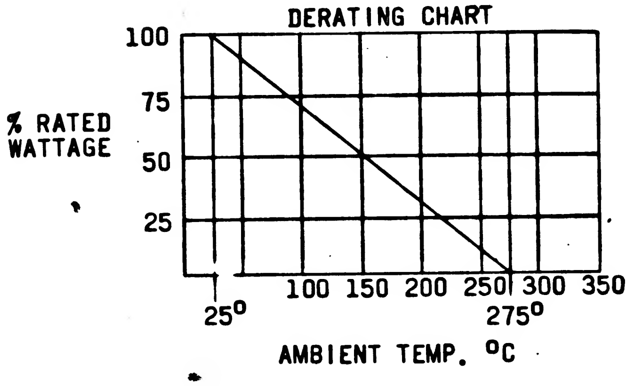
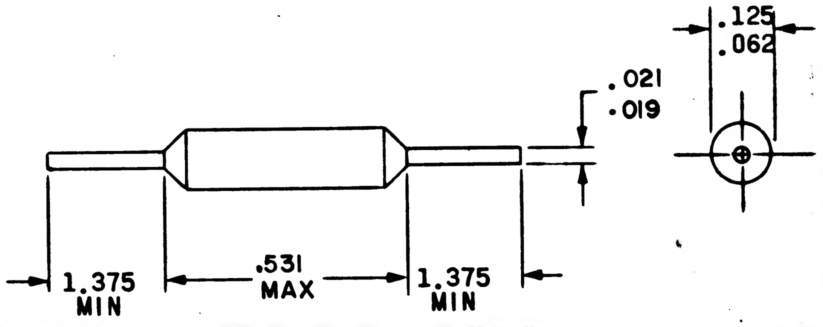
G	REVISED PER TDRR 11136	7/28/64	WK
H	REVISED PER TDRR 14481	12-1-64	WK
J	REVISED PER TDRR 16595	2/24/65	WK

DERATING CHART





QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS 9-497

DRAWN D. L. Jacobs DATE 24 JUL 63
CHECKED Hodgins 27 JULY 63
APPROVAL D. R. Test 8/13/63
APPROVAL
NASA APPROVAL W J Rhine 8-14-63
MIT APPROVAL W Sniffen 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, WIREWOUND
1 WATT
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010604
SCALE NONE
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

K | 1010604

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3. DESIGN REQUIREMENTS:
   - A. PER MIL-R-26 EXCEPT AS MODIFIED BY THIS DRAWING.
   - B. POWER RATING: 1 WATT AT +25°C, DERATED PER CHART.
   - C. TEMPERATURE COEFFICIENT: ± 30 PPM/°C UP TO +275°C.
   - D. EACH LEAD SHALL BE CAPABLE OF WITHSTANDING TWO (2) BENDS UNDER A TWO (2) POUND VERTICAL PULL (LEADS VERTICAL WITH RESPECT TO UNIT BODY). TWO (2) BENDS SHALL BE ACCOMPLISHED BY MOVING THE BODY OF THE UNIT, WHILE IN THE SAME PLANE, THROUGH 90° IN ONE DIRECTION, THEN BACK 180° TO THE OPPOSITE DIRECTION, THEN BACK 90° TO THE ORIGINAL POSITION. NO MECHANICAL DAMAGE OR LACK OF PERFORMANCE SHALL BE EVIDENCED AFTER THE TEST.
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5	640
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8	670
9	680
10	690
11	700
12	710
13	720
14	730
15	740
16	750
17	760
18	770
19	780
20	790
21	800
22	1000

NASA PART NUMBER	RESISTANCE OHMS, NOMINAL
23	1
24	2
25	3
26	4
27	5
28	6
29	7
30	8
31	9
32	10
33	100
34	1800
35	430
36	0.75
37	300
38	3300
39	2000
40	16
41	18
42	20
43	22
44	24
45	360
46	510
47	1300
48	75
49	40
50	1500
51	1600
52	2100
53	2200
54	2300
55	60
56	65
57	70
58	80
59	85
60	90

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
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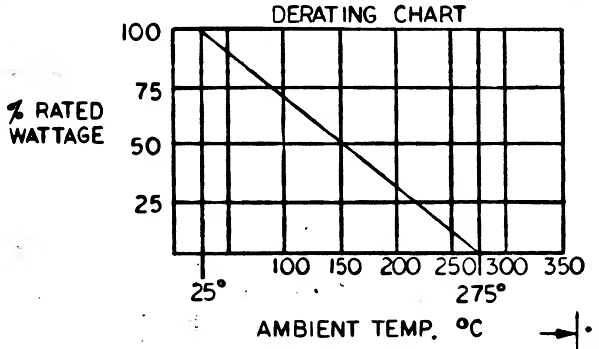
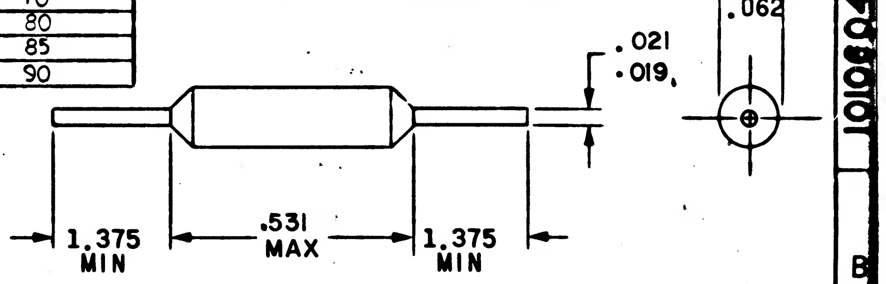
E	REVISED PER TDRR 10810	7/7/64	WK
F	REVISED PER TDRR 10925	7/21/64	WK.
G	REVISED PER TDRR 11136	7/28/64	WK
H	REVISED PER TDRR 14481	12-1-64	WK
J	REVISED PER TDRR 16595	2/24/65	WK
K	REVISED PER TDRR 25364	1/25/66	WK





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LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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DIMENSIONS ARE IN INCHES
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FRACTIONS ± DECIMALS ± ANGLES
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTES

HEAT TREATMENT
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FINAL FINISH
NONE

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS 9-497

DRAWN G. L. Jacobs DATE 24 JUL 63
CHECKED Hogue 27 JULY 63
APPROVAL D. R. Test 8/13/63
APPROVAL

NASA APPROVAL W J Rhine 8-14-63

MIT APPROVAL W. Koffel 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, WIREWOUND
1 WATT
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010604
SCALE NONE
WT
SHEET 1 OF 1

1010604 K

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REQUIREMENTS:

1. GENERAL:
   - A. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF SPECIFICATION MIL-R-26 FOR INSULATED TYPE; EXCEPT AS SPECIFIED HEREIN.
   - B. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002057 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - C. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - D. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - E. PACKAGING: UNITS SHALL BE PACKAGED IN ACCORDANCE WITH ND 1002129.

2. INSPECTION AND ACCEPTANCE
   - A. ELECTRICAL REQUIREMENTS:
     - (1) RESISTANCE VALUE: PER TABLE
     - (2) RESISTANCE TOLERANCE: ± 1%
   - B. MECHANICAL REQUIREMENTS:
     - (1) LEADS: IRON NICKEL ALLOY COPPER CLAD GOLD PLATED PER NASA SPECIFICATION PS 1015401. A CERTIFICATE OF COMPLIANCE OF LEAD MATERIAL SHALL ACCOMPANY EACH LOT SHIPPED.
     - (2) MARKING: MARK UNITS PER ND1002019 WITH MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, DATE CODE
       MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL INCLUDE NASA PART NUMBER AND REVISION LETTER, PER MIL-STD-129.

3. DESIGN REQUIREMENTS:
   - A. PER MIL-R-26 EXCEPT AS MODIFIED BY THIS DRAWING.
   - B. POWER RATING: 1 WATT AT +25°C, DERATED PER CHART.
   - C. TEMPERATURE COEFFICIENT:
     - 1100 OHMS AND ABOVE = ± 20 PPM/°C
     - 20 OHMS TO 1090 OHMS = ± 30 PPM/°C
     - 1 OHM TO 19.9 OHMS = ± 50 PPM/°C
     - 1 OHM AND BELOW = ± 100 PPM/°C (+.05 OHMS)
   - D. EACH LEAD SHALL BE CAPABLE OF WITHSTANDING TWO (2) BENDS UNDER A TWO (2) POUND VERTICAL PULL (LEADS VERTICAL WITH RESPECT TO UNIT BODY). TWO (2) BENDS SHALL BE ACCOMPLISHED BY MOVING THE BODY OF THE UNIT, WHILE IN THE SAME PLANE, THROUGH 90° IN ONE DIRECTION, THEN BACK 180° TO THE OPPOSITE DIRECTION, THEN BACK 90° TO THE ORIGINAL POSITION. NO MECHANICAL DAMAGE OR LACK OF PERFORMANCE SHALL BE EVIDENCED AFTER THE TEST.
   - E. MECHANICAL STRENGTH: PER MIL-R-26 EXCEPT 5 LB. MAX LOAD

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. BURN-IN: UNITS SHALL BE BURNED-IN FOR 100 HRS AT 25°C AND RATED WATTAGE 1-1/2 HRS ON, 1/2 HR OFF, UNITS THAT EXCEED THE INITIAL TOLERANCE OR CHANGE MORE THAN .5% SHALL BE REJECTED.

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

NASA PART NUMBER	RESISTANCE OHMS NOMINAL
1	600
2	610
3	620
4	630
5	640
6	650
7	660
8	670
9	680
10	690
11	700
12	710
13	720
14	730
15	740
16	750
17	760
18	770
19	780
20	790
21	800
22	1000

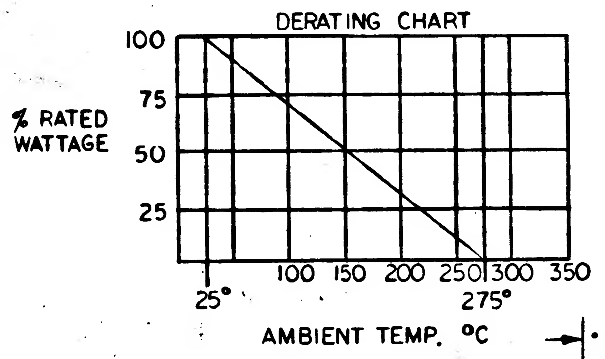
PART NO.	RES OHMS NOMINAL
61	0.5
62	2150
63	30.1
64	4120
65	33
66	4700
67	3000
68	31.6
69	51
70	0.01

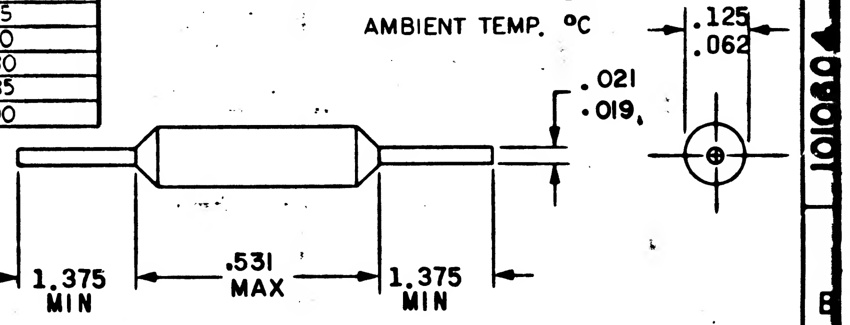
	1010604

NASA PART NUMBER	RESISTANCE OHMS, NOMINAL
23	1
24	2
25	3
26	4
27	5
28	6
29	7
30	8
31	9
32	10
33	100
34	1800
35	430
36	0.75
37	300
38	3300
39	2000
40	16
41	18
42	20
43	22
44	24
45	360
46	510
47	1300
48	75
49	40
50	1500
51	1600
52	2100
53	2200
54	2300
55	60
56	65
57	70
58	80
59	85
60	90

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
=	INITIAL RELEASE CLASS A PER TDRR 02599	8/14/63	WK.
A	REVISED PER TDRR 03702	8 [illegible] 63	WK
B	REVISED PER TDRR 06773	3/10/64	EPK WK
C	REVISED PER TDRR 07104	3/24/64	EPK WK
D	REVISED PER TDRR 07314	3/31/64	EPK WK
E	REVISED PER TDRR 10810	7/7/64	WK
F	REVISED PER TDRR 10925	7/21/64	WK.
G	REVISED PER TDRR 11136	7/28/64	WK
H	REVISED PER TDRR 14481	12-1-64	WK
J	REVISED PER TDRR 16595	2/24/65	WK
K	REVISED PER TDRR 25364	1/25/66	WK
L	REVISED PER TDRR 25942	2/15/66	WK





QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS 9-497
DRAWN G. L. Jacobs DATE 24 JUL 63
CHECKED Hogue 27 JULY 63
APPROVAL D. B. Test 8/13/63
APPROVAL
NASA APPROVAL W J Rhine F-14-63
MIT APPROVAL W [illegible] 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, WIREWOUND
1 WATT
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010604
SCALE NONE
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

1010604 M

REQUIREMENTS:

1. GENERAL:
   - A. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF SPECIFICATION MIL-R-26 FOR INSULATED TYPE; EXCEPT AS SPECIFIED HEREIN.
   - B. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002057 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - C. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - D. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - E. PACKAGING: UNITS SHALL BE PACKAGED IN ACCORDANCE WITH ND 1002129.

2. INSPECTION AND ACCEPTANCE
   - A. ELECTRICAL REQUIREMENTS:
     - (1) RESISTANCE VALUE: PER TABLE
     - (2) RESISTANCE TOLERANCE: ± 1%
   - B. MECHANICAL REQUIREMENTS:
     - (1) LEADS: IRON NICKEL ALLOY COPPER CLAD GOLD PLATED PER NASA SPECIFICATION PS 1015401. A CERTIFICATE OF COMPLIANCE OF LEAD MATERIAL SHALL ACCOMPANY EACH LOT SHIPPED.
     - (2) MARKING: MARK UNITS PER ND1002019 WITH MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, DATE CODE
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   - A. PER MIL-R-26 EXCEPT AS MODIFIED BY THIS DRAWING.
   - B. POWER RATING: 1 WATT AT +25°C, DERATED PER CHART.
   - C. TEMPERATURE COEFFICIENT:
     - 1100 OHMS AND ABOVE = ± 20 PPM/°C
     - 20 OHMS TO 1090 OHMS = ± 30 PPM/°C
     - 1 OHM TO 19.9 OHMS = ± 50 PPM/°C
     - 1 OHM AND BELOW = ± 100 PPM/°C (+.05 OHMS)
   - D. EACH LEAD SHALL BE CAPABLE OF WITHSTANDING TWO (2) BENDS UNDER A TWO (2) POUND VERTICAL PULL (LEADS VERTICAL WITH RESPECT TO UNIT BODY). TWO (2) BENDS SHALL BE ACCOMPLISHED BY MOVING THE BODY OF THE UNIT, WHILE IN THE SAME PLANE, THROUGH 90° IN ONE DIRECTION, THEN BACK 180° TO THE OPPOSITE DIRECTION, THEN BACK 90° TO THE ORIGINAL POSITION. NO MECHANICAL DAMAGE OR LACK OF PERFORMANCE SHALL BE EVIDENCED AFTER THE TEST.
   - E. MECHANICAL STRENGTH: PER MIL-R-26 EXCEPT 5 LB. MAX LOAD

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. BURN-IN: UNITS SHALL BE BURNED-IN FOR 100 HRS AT 25°C AND RATED WATTAGE 1-1/2 HRS ON, 1/2 HR OFF, UNITS THAT EXCEED THE INITIAL TOLERANCE OR CHANGE MORE THAN .5% SHALL BE REJECTED.

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

NASA PART NUMBER	RESISTANCE OHMS NOMINAL
1	600
2	610
3	620
4	630
5	640
6	650
7	660
8	670
9	680
10	690
11	700
12	710
13	720
14	730
15	740
16	750
17	760
18	770
19	780
20	790
21	800
22	1000

NASA PART NUMBER	RESISTANCE OHMS, NOMINAL
23	1
24	2
25	3
26	4
27	5
28	6
29	7
30	8
31	9
32	10
33	100
34	1800
35	430
36	0.75
37	300
38	3300
39	2000
40	16
41	18
42	20
43	22
44	24
45	360
46	510
47	1300
48	75
49	40
50	1500
51	1600
52	2100
53	2200
54	2300
55	60
56	65
57	70
58	80
59	85
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PART NO.	RES OHMS NOMINAL
61	0.5
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66	4700
67	3000
68	31.6
69	51
70	0.01
71	30
72	31
73	26
74	28
75	32

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02599	8/14/63	WK
A	REVISED PER TDRR 03702	8 Oct 63	WK
B	REVISED PER TDRR 06773	3/10/64	EPK WK
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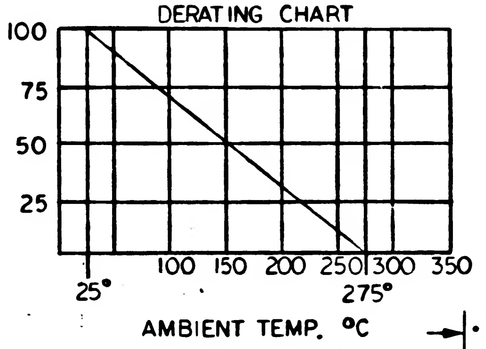
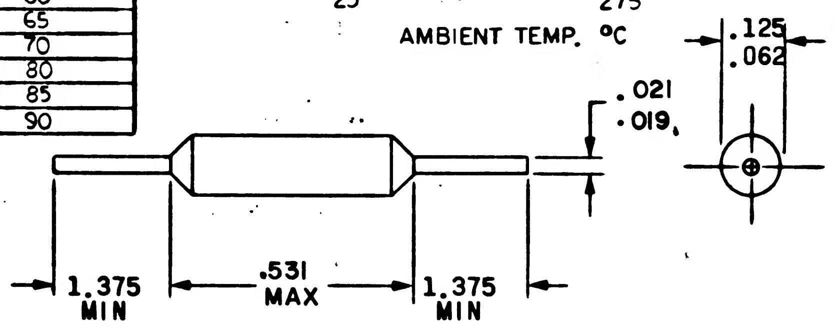
G	REVISED PER TDRR 11136	7/28/64	WK
H	REVISED PER TDRR 14481	12-1-64	WK
J	REVISED PER TDRR 16595	2/24/65	WK
K	REVISED PER TDRR 25364	1/25/66	WK
L	REVISED PER TDRR 25942	2/15/66	WK
M	REVISED PER TDRR 27115	3/[illegible]	WK


DERATING CHART



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS 9-497

DRAWN H. L. Jacobe DATE 24 JUL 63
CHECKED Hogue 27 JULY 63
APPROVAL D. B. Test 8/13/63
APPROVAL
NASA APPROVAL W. J. Rhine 8-14-63
MIT APPROVAL W Suffer 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, WIREWOUND
1 WATT
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010604
SCALE NONE
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

1010604

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02599	8/14/63	WK.

REQUIREMENTS:

GENERAL:

UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF SPECIFICATION MIL-R-26 FOR INSULATED TYPE; EXCEPT AS SPECIFIED HEREIN.

UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002057 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

PACKAGING: UNITS SHALL BE PACKAGED IN ACCORDANCE WITH ND 1002129.

INSPECTION AND ACCEPTANCE

ELECTRICAL REQUIREMENTS:

RESISTANCE VALUE: PER TABLE

RESISTANCE TOLERANCE: ± 1%

MECHANICAL REQUIREMENTS:

LEADS: IRON NICKEL ALLOY COPPER CLAD GOLD PLATED PER NASA SPECIFICATION PS 1015401. A CERTIFICATE OF COMPLIANCE OF LEAD MATERIAL SHALL ACCOMPANY EACH LOT SHIPPED.

MARKING: MARK UNITS PER MIL-STD-130 WITH MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, DATE CODE

MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL INCLUDE NASA PART NUMBER AND REVISION LETTER.

DESIGN REQUIREMENTS:

PER MIL-R-26 EXCEPT AS MODIFIED BY THIS DRAWING.

POWER RATING: 1 WATT AT +25°C, DERATED PER CHART.

TEMPERATURE COEFFICIENT: ± 30 PPM/°C UP TO +275°C.

EACH LEAD SHALL BE CAPABLE OF WITHSTANDING TWO (2) BENDS UNDER A TWO (2) POUND VERTICAL PULL (LEADS VERTICAL WITH RESPECT TO UNIT BODY). TWO (2) BENDS SHALL BE ACCOMPLISHED BY MOVING THE BODY OF THE UNIT, WHILE IN THE SAME PLANE, THROUGH 90° IN ONE DIRECTION, THEN BACK 180° TO THE OPPOSITE DIRECTION, THEN BACK 90° TO THE ORIGINAL POSITION. NO MECHANICAL DAMAGE OR LACK OF PERFORMANCE SHALL BE EVIDENCED AFTER THE TEST.

MECHANICAL STRENGTH: PER MIL-R-26 EXCEPT 5 LB. MAX LOAD

SPECIAL CONDITIONING BY SUPPLIER:

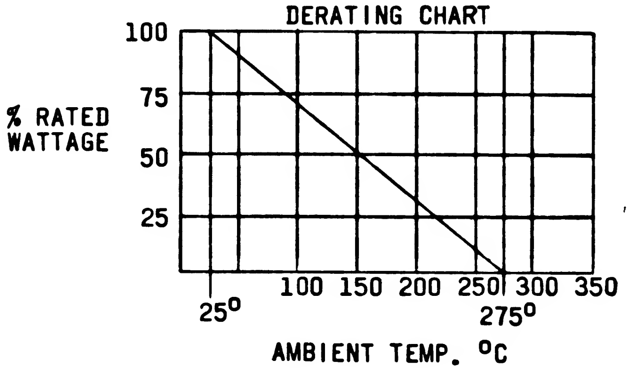
BURN-IN: UNITS SHALL BE BURNED-IN FOR 100 HRS AT 25°C AND RATED WATTAGE 1-1/2 HRS ON, 1/2 HR OFF. UNITS THAT EXCEED THE INITIAL TOLERANCE OR CHANGE MORE THAN .5% SHALL BE REJECTED.

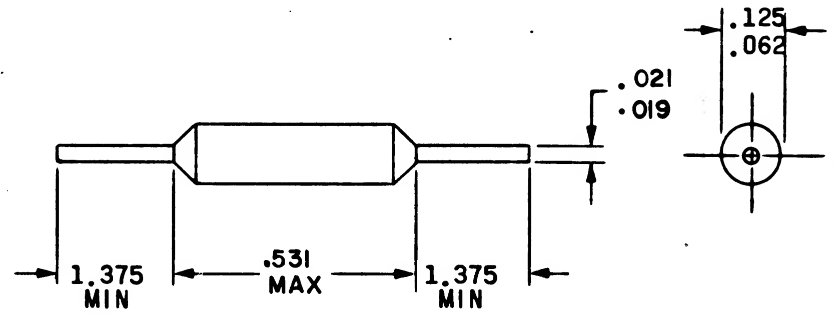
PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

NASA PART NUMBER	RESISTANCE OHMS NOMINAL
1	600
2	610
3	620
4	630
5	640
6	650
7	660
8	670
9	680
10	690
11	700
12	710
13	720
14	730
15	740
16	750
17	760
18	770
19	780
20	790
21	800
22	1000

THE COMPLETE PART NUMBER IS THIS DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

DERATING CHART





QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES

HEAT TREATMENT NONE

FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS 9-497

DRAWN G. L. Jacobs DATE 24 JUL 63
CHECKED Hogue 27 JULY 63
APPROVAL D. G. Test 8/13/63
APPROVAL
NASA APPROVAL W. J. Rhine 8-14-63
MIT APPROVAL 14 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, WIREWOUND
1 WATT
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010604
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

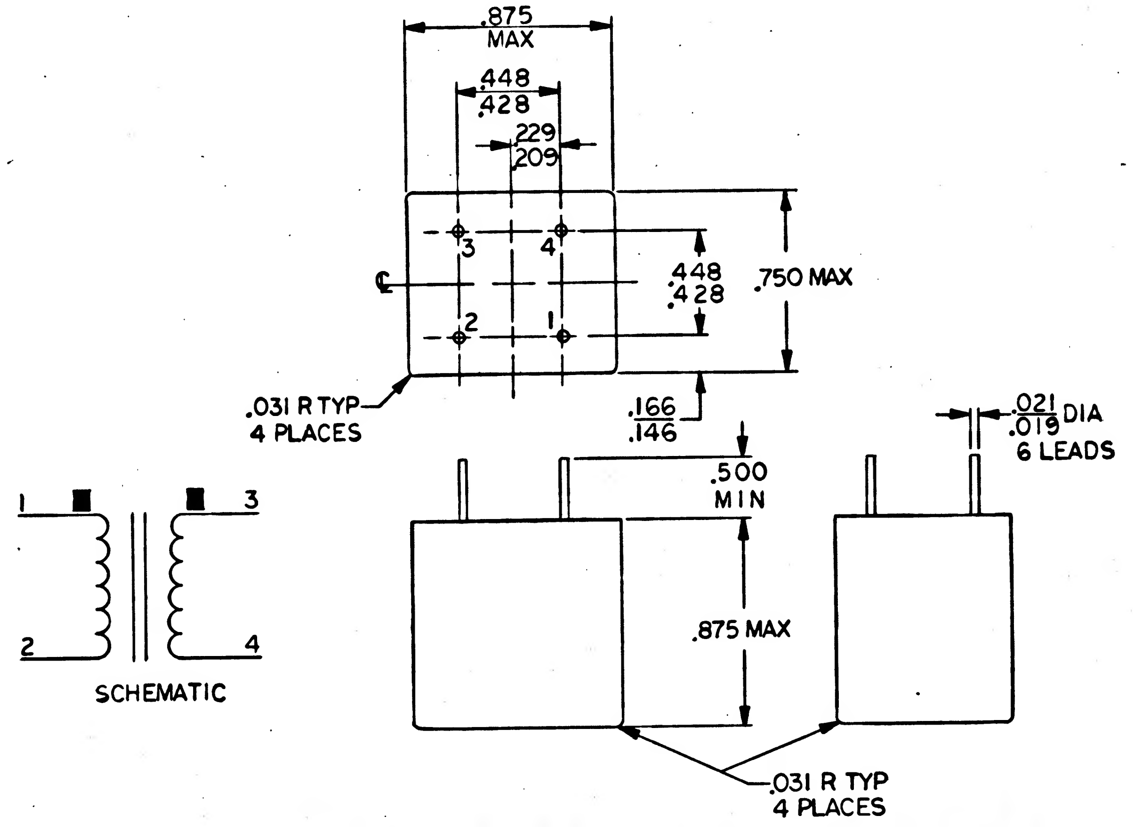
1010605 A

REVISIONS 01788

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02479	8-7-63	wlc

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF MIL-T-27 WITH THE ADDITIONS AND EXCEPTIONS SPECIFIED HEREIN.
   - C. SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404, CLASS 2.
   - D. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002047.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) LEAD MATERIAL SHALL BE PER ND 1015400. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
     - (2) MARKING-MANUFACTURER'S SERIAL NUMBER, ALL MARKING REQUIREMENTS OF MIL-T-27, AND NASA DRAWING NUMBER (1010605) AND REVISION LETTER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE UNIT.
     - (3) DIMENSIONS: SEE FIGURE.
   - B: ELECTRICAL REQUIREMENTS - UNIT SHALL MEET ALL REQUIREMENTS OF TABLE 1.
3. DESIGN:
   - A. THE UNIT SHALL MEET ALL REQUIREMENTS OF MIL-T-27, TYPE TF5RX21ZZ.
   - B. WORKING VOLTAGE: 175 VOLTS.
   - C. UNIT SHALL BE LAYER WOUND.
   - D. UNIT SHALL BE CAPABLE OF DELIVERING 4.0 MW TO A 1000 OHM RESISTIVE LOAD WHEN 28 VOLTS RMS AT 800 CYCLES IS APPLIED TO TERMINALS 1-2.
   - E. AMBIENT TEMPERATURE: +85°C MAXIMUM



SCHEMATIC

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

A	A
—	—
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 20 June 63
CHECKED A. Martz 6-21-63
APPROVAL R. L. Battaglia
APPROVAL
NASA APPROVAL
MIT APPROVAL D Hafel 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER
(25° OFFSET)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010605
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS 01788

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02479	8-7-63	wll

TABLE 1

INSPECTION AND ACCEPTION TESTS

NUMBER IN PARAGRAPH COLUMN REFER TO PARAGRAPH NUMBER IN SPECIFICATION MIL-T-27

PARAGRAPH	
4.7.3.2.1	SEALING
4.7.5	DIELECTRIC STRENGTH: TEST VOLTAGE: 500 VOLTS
4.7.6	INDUCED VOLTAGE: TEST VOLTAGE: 56 VOLTS AT 1600 CPS AT TERMINALS 1-2, SECONDARY OPEN. I = 10 MA MAX.
4.7.7	INSULATION RESISTANCE: 10,000 MEG. MIN., AT 25°C
4.7.9.2.1	OUTPUT VOLTAGE: TEST VOLTAGE: 28 VOLTS AT 800 CPS AT TERMINALS 1-2. R_L = 1K OHMS ± 5% AT TERMINALS 3-4. RATIO $\frac{E(3-4)}{E(1-2)} = .2217 \pm .4\%$
4.7.9.3	DC RESISTANCE AT 25°C: R(1-2) = 25 OHMS MAX., R(3-4) = 3 OHMS MAX.
4.7.9.1.1. (a)	NO-LOAD CURRENT TEST VOLTAGE: 28 VOLTS RMS AT 800 CYCLES AT TERMINALS 1-2. I = 7 MA MAXIMUM
4.7.9.14	POLARITY: TERMINALS 1 AND 3 SHALL BE OF LIKE POLARITY

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

HEAT TREATMENT

FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kano DATE 20 Jun 63
CHECKED A. Matz 6-21-63
APPROVAL R. L. Battalfson
APPROVAL

NASA APPROVAL Jack Barnard

MIT APPROVAL D. Hoag 6/24/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER
(25° OFFSET)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010605
SCALE NONE
WT
SHEET 2 OF 2

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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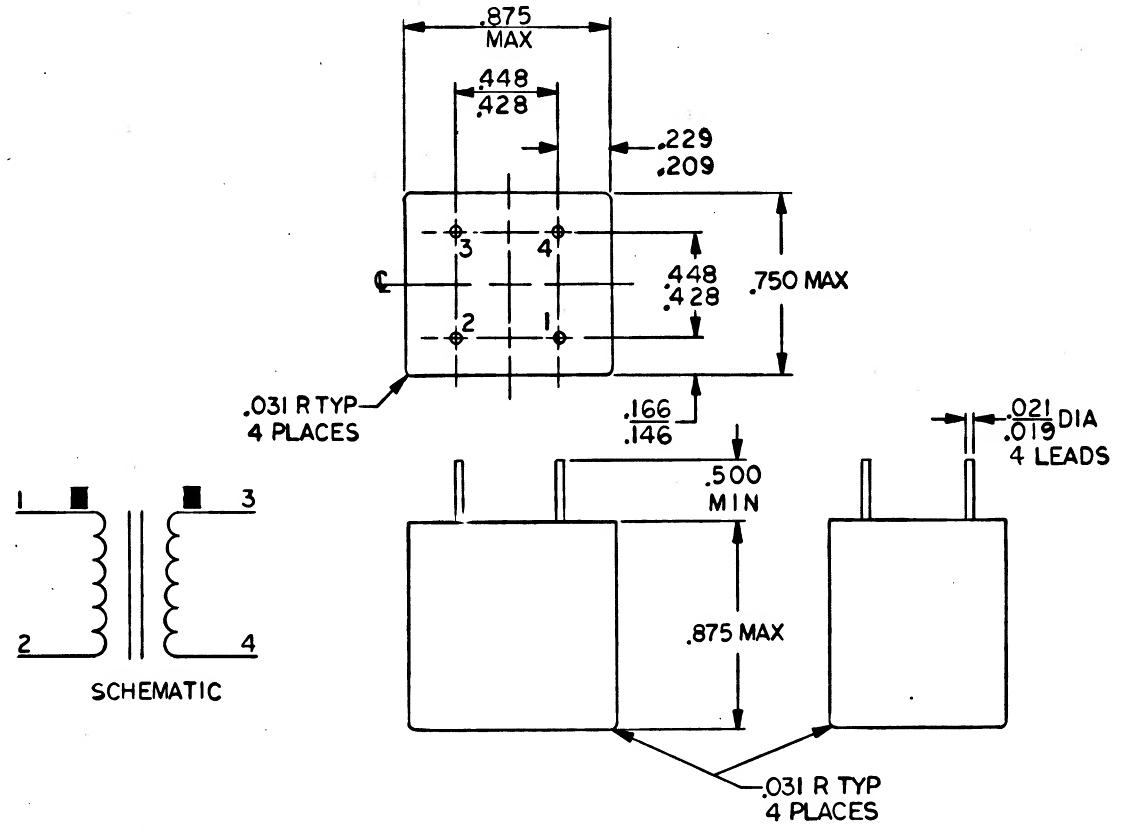
REVISIONS 01788

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02479	8-7-63	WK
B	REVISED PER TDRR 03506	10-8-63	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF MIL-T-27 WITH THE ADDITIONS AND EXCEPTIONS SPECIFIED HEREIN.
   - C. SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404, CLASS 2.
   - D. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002047.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) LEAD MATERIAL SHALL BE PER ND 1015400. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
     - (2) MARKING-MARK PERMANENTLY AND LEGIBLY WITH NASA DRAWING NUMBER AND REVISION LETTER, MANUFACTURER'S SERIAL NUMBER AND TERMINAL IDENTIFICATION.
     - (3) DIMENSIONS: SEE FIGURE.
   - B: ELECTRICAL REQUIREMENTS - UNIT SHALL MEET ALL REQUIREMENTS OF TABLE 1.
3. DESIGN:
   - A. THE UNIT SHALL MEET ALL REQUIREMENTS OF MIL-T-27, TYPE TF5RX09ZZ
   - B. WORKING VOLTAGE: 175 VOLTS.
   - C. UNIT SHALL BE LAYER WOUND.
   - D. UNIT SHALL BE CAPABLE OF DELIVERING 4.0 MW TO A 1000 OHM RESISTIVE LOAD WHEN 28 VOLTS RMS AT 800 CYCLES IS APPLIED TO TERMINALS 1-2.
   - E. AMBIENT TEMPERATURE: +85°C MAXIMUM



PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

B	B
A	A
—	—
SHEET 1	SHEET 2

REVISION STATUS OF SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kane DATE 20 June 63
CHECKED A. Martz 6-21-63
APPROVAL R. L. Ballantyne
APPROVAL
NASA APPROVAL Jack Beaman
MIT APPROVAL D. Hoag 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER
(25° OFFSET)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010605
SCALE NONE
WT
SHEET 1 OF 2

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 01788

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02479	8-7-63	WK
B	REVISED PER TDRR 03506	1 Oct 63	WK

TABLE 1

INSPECTION AND ACCEPTANCE TESTS

NUMBER IN PARAGRAPH COLUMN REFER TO PARAGRAPH NUMBER IN SPECIFICATION MIL-T-27

PARAGRAPH	
4.7.3.2.1	SEALING
4.7.5	DIELECTRIC STRENGTH: TEST VOLTAGE: 500 VOLTS
4.7.6	INDUCED VOLTAGE: TEST VOLTAGE: 56 VOLTS AT 1600 CPS AT TERMINALS 1-2, SECONDARY OPEN. I = 18.7MA MAX.
4.7.7	INSULATION RESISTANCE: 10,000 MEG. MIN., AT 25°C
4.7.9.2.1	OUTPUT VOLTAGE: TEST VOLTAGE: 28 VOLTS AT 800 CPS AT TERMINALS 1-2. R_L = 1K OHMS ± 5% AT TERMINALS 3-4. RATIO $\frac{E(3-4)}{E(1-2)} = .2217 \pm 1\%$
4.7.9.3	DC RESISTANCE AT 25°C: R(1-2) = 25 OHMS MAX., R(3-4) = 3 OHMS MAX.
4.7.9.1.1. (a)	NO-LOAD CURRENT TEST VOLTAGE: 28 VOLTS RMS AT 800 CYCLES AT TERMINALS 1-2. I = 9.35 MA MAXIMUM
4.7.9.14	POLARITY: TERMINALS 1 AND 3 SHALL BE OF LIKE POLARITY

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kano DATE 20 Jun 63
CHECKED 6-21-63
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 6/24/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER
(25° OFFSET)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010605
SCALE NONE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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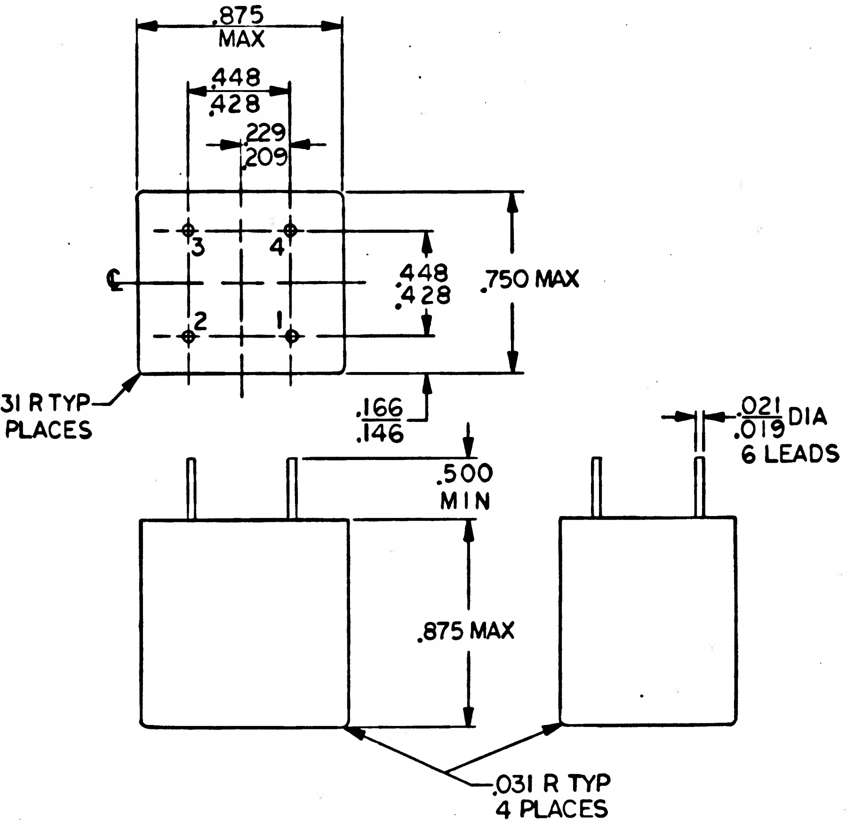
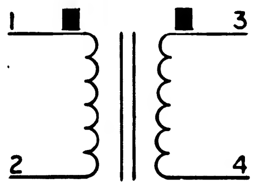
1010605

REVISIONS 01788			
SYM	DESCRIPTION	DATE	APPROVAL

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF MIL-T-27 WITH THE ADDITIONS AND EXCEPTIONS SPECIFIED HEREIN.
   - C. SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404, CLASS 2.
   - D. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002047.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) LEAD MATERIAL SHALL BE PER ND 1015400. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
     - (2) MARKING-MANUFACTURER'S SERIAL NUMBER, ALL MARKING REQUIREMENTS OF MIL-T-27, AND NASA DRAWING NUMBER (1010605) AND REVISION LETTER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE UNIT.
     - (3) DIMENSIONS: SEE FIGURE.
   - B: ELECTRICAL REQUIREMENTS - UNIT SHALL MEET ALL REQUIREMENTS OF TABLE 1.
3. DESIGN:
   - A. THE UNIT SHALL MEET ALL REQUIREMENTS OF MIL-T-27, TYPE TF5RX21ZZ.
   - B. WORKING VOLTAGE: 175 VOLTS.
   - C. UNIT SHALL BE LAYER WOUND.
   - D. UNIT SHALL BE CAPABLE OF DELIVERING 4.0 MW TO A 1000 OHM RESISTIVE LOAD WHEN 28 VOLTS RMS AT 800 CYCLES IS APPLIED TO TERMINALS 1-2.
   - E. AMBIENT TEMPERATURE: +85°C MAXIMUM





SCHEMATIC

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

HEAT TREATMENT

FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kane DATE 20 June, 63
CHECKED A. Martz 6-21-63
APPROVAL R. L. Ballantyne
APPROVAL

NASA APPROVAL Jack Bassman

MIT APPROVAL D. Nagel 4/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER
(25° OFFSET)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010605

SCALE NONE WT SHEET 1 OF 2

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS 01788			
SYM	DESCRIPTION	DATE	APPROVAL

TABLE 1

INSPECTION AND ACCEPTION TESTS

NUMBER IN PARAGRAPH COLUMN REFER TO PARAGRAPH NUMBER IN SPECIFICATION MIL-T-27

PARAGRAPH	
4.7.3.2.1	SEALING
4.7.5	DIELECTRIC STRENGTH: TEST VOLTAGE: 500 VOLTS
4.7.6	INDUCED VOLTAGE: TEST VOLTAGE: 56 VOLTS AT 1600 CPS AT TERMINALS 1-2, SECONDARY OPEN. I = 600 MA MAX.
4.7.7	INSULATION RESISTANCE: 10,000 MEG. MIN., AT 25°C
4.7.9.2.1	OUTPUT VOLTAGE: TEST VOLTAGE: 28 VOLTS AT 800 CPS AT TERMINALS 1-2. R_L = 1K OHMS ±5% AT TERMINALS 3-4. RATIO $\frac{E(1-2)}{E(3-4)} = .2217 \pm .4\%$
4.7.9.3	DC RESISTANCE AT 25°C: R(1-2) = 25 OHMS MAX., R(3-4) = 3 OHMS MAX.
4.7.9.1.1. (a)	NO-LOAD CURRENT TEST VOLTAGE: 28 VOLTS RMS AT 800 CYCLES AT TERMINALS 1-2. [illegible] I = 7 MA MAXIMUM [illegible]
4.7.9.14	POLARITY: TERMINALS 1 AND 3 SHALL BE OF LIKE POLARITY

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kane DATE 20 June 63
CHECKED A. Marty 6-21-63
APPROVAL R. L. Battalfson
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL D. Hoag 6/24/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER
(25° OFFSET)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010605
SCALE NONE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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1010607 A

REVISIONS TDRR 01546 12 June 1963

SYM	DESCRIPTION	DATE	APPROVAL
A	UPGRADED TO CLASS A PER TDRR 02757	8/21/63	JH

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA DOCUMENT ND 1015404, CLASS 2.

C. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002052.

D. MARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-130 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, IDENTIFYING NUMBER, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

E. CONTACTS PER 1010464, TO BE SUPPLIED LOOSE WITH CONNECTOR.

2. ACCEPTANCE AND INSPECTION:

A. DIMENSIONS PER DRAWING.

3. DESIGN REQUIREMENTS:

A. MECHANICAL PROPERTIES:

(1) MATERIAL: BODY - DIALLYL PHTHALATE PER MIL-M-19833, TYPE SDI-5 OR GDI-30 AS APPLICABLE.

CONTACTS - 1/2 HARD BRASS GOLD PLATED PER MIL-G-45204, TYPE 2, CLASS 1.

HARDWARE - ALIGNMENT AND MOUNTING HARDWARE SHALL BE NON MAGNETIC CORROSION RESISTANT STEEL, PASSIVATED.

B. ELECTRICAL CHARACTERISTICS:

(1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 160°F MEASURED BETWEEN TWO CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY CONTACT.

(2) DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 1500 VRMS. 90,000 TO 130,000 FT - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 250 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT.

(3) CONTACT MATERIAL RESISTANCE: 0.003 OHMS, MAXIMUM.

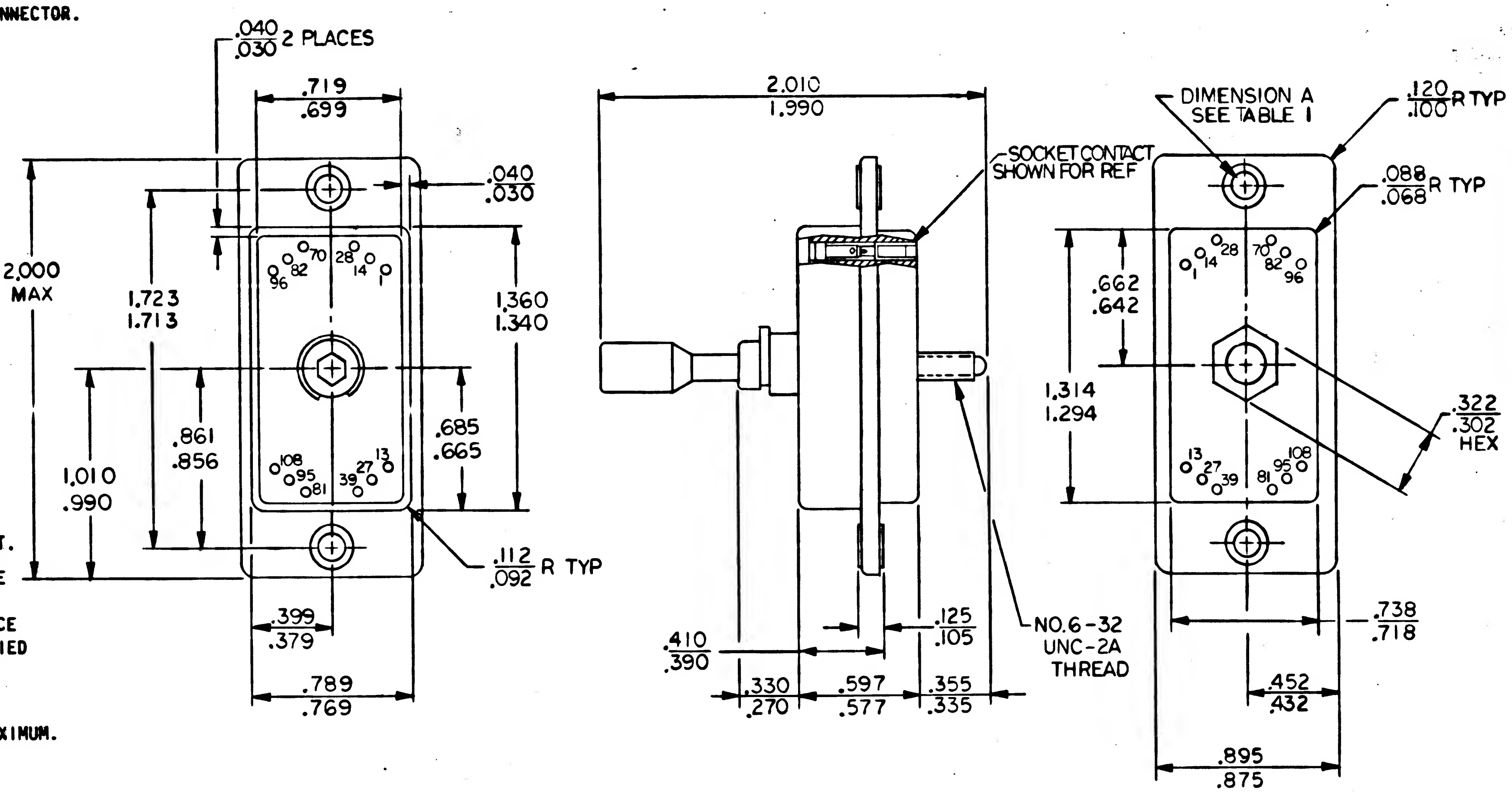

FIGURE 1 1010607-1

A	A
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 3 JUNE 63
CHECKED A. Marts 6-11-63
APPROVAL 6/11/63
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL Perry K. Bryant

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, RECEPTACLE, ELECTRICAL
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010607
SCALE NONE WT SHEET 1 OF 2

1010607

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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1010607 A

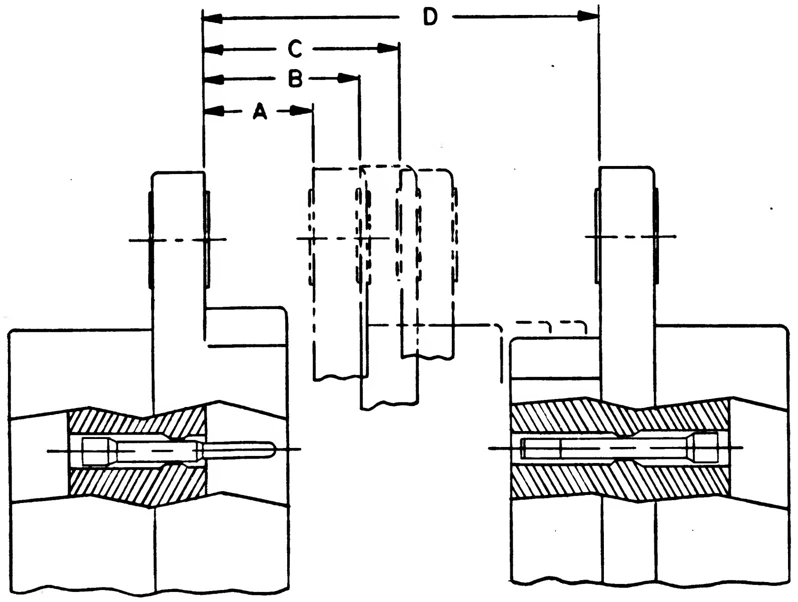
Ⓜ

REVISIONS TDRR 01594C 13 June 1963

SYM	DESCRIPTION	DATE	APPROVAL
A	UPGRADED TO CLASS A RELEASE PER TDRR #2757	6/11/63	DW

TABLE I

DASH NO.	DRAWING FIGURE NO.	DIM A	CONTACT TYPE
-1	1	.161 .151	SOCKET PER 1010464-2
-2	2	.161 .151	SOCKET PER 1010464-2



	JACKSCREW	RACK & PANEL HARDWARE
A (FULLY ENGAGED)	.220	.220
B (PIN DISENGAGED)	.350	.350
C (HEX DISENGAGED)	.390	.390
D (FULLY DISENGAGED)	1.020	1.020

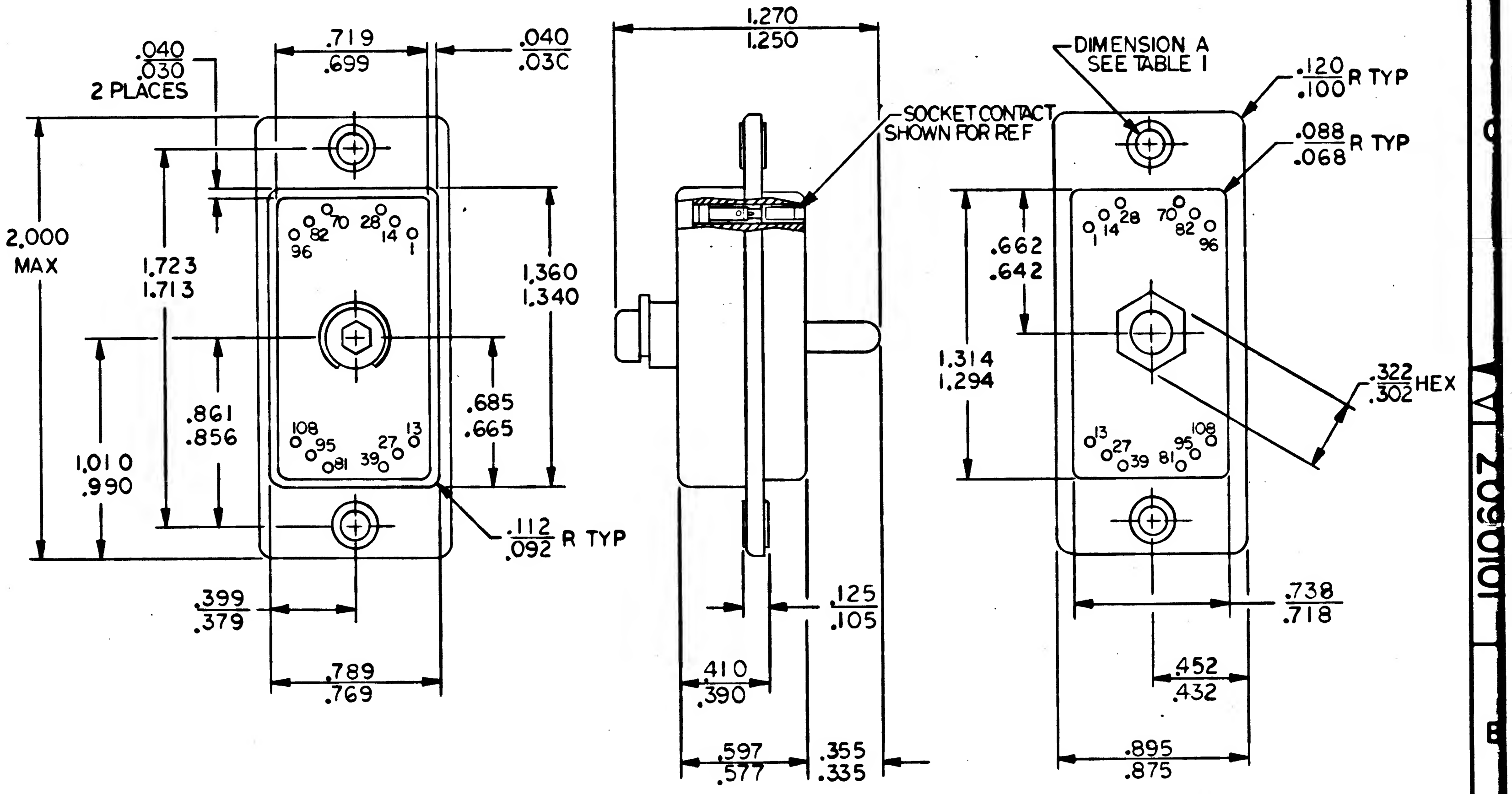


FIGURE 2

1010607-2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kane DATE 3 June 63
CHECKED G. Martz 6-11-63
APPROVAL 6/11/63
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL Perry K Bryant

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, RECEPTACLE, ELECTRICAL
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010607
SCALE NONE WT SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010607 A

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B 1010607 Ⓜ

REVISIONS TDRR 01546		12 June 1963	
SYM	DESCRIPTION	DATE	APPROVAL
A	UPGRADED TO CLASS A PER TDRR 02757		
B	REVISED PER TDRR 06533		WR

REQUIREMENTS:

1. GENERAL:

   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

   B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA DOCUMENT ND 1015404, CLASS 2.

   C. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002052.

   D. MARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH ND 1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, IDENTIFYING NUMBER, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

   E. CONNECTOR IS DESIGNED TO UTILIZE SOCKET CONTACTS PER 1010738-2.

2. ACCEPTANCE AND INSPECTION:

   A. DIMENSIONS PER DRAWING.

3. DESIGN REQUIREMENTS:

   A. MECHANICAL PROPERTIES:

      (1) MATERIAL: BODY - DIALLYL PHTHALATE PER MIL-M-19833, TYPE SDI-5 OR GDI-30 F AS APPLICABLE.

      [illegible] 404, [illegible]

      HARDWARE - ALIGNMENT AND MOUNTING HARDWARE SHALL BE NON MAGNETIC CORROSION RESISTANT STEEL, PASSIVATED.

   B. ELECTRICAL CHARACTERISTICS:

      (1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 160°F MEASURED BETWEEN TWO CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY CONTACT.

      (2) DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 1500 VRMS. 90,000 TO 130,000 FT - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 250 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT.

      ( ) CONTACT [illegible] RESISTANCE: 0.003 OHMS, [illegible].

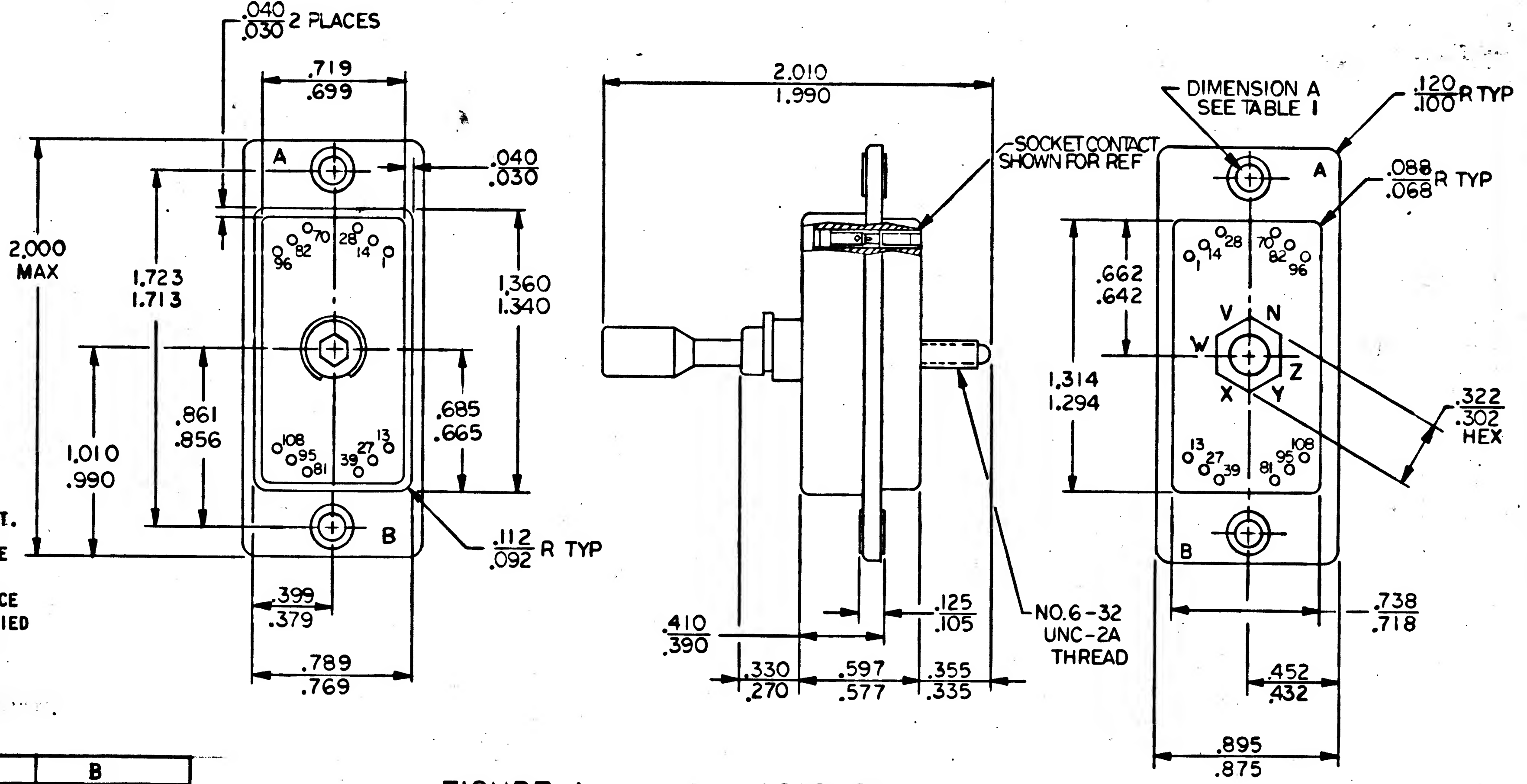


FIGURE I

1010607-1

B	B
A	A
SHEET 1	SHEET 2

REVISION STATUS OF SHEETS

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 3 JUNE 63
CHECKED A. Marts 6-11-63
APPROVAL 6/11/63
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, RECEPTACLE, ELECTRICAL
(108 #22 SOCKET CONTACTS)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010607
SCALE NONE WT SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

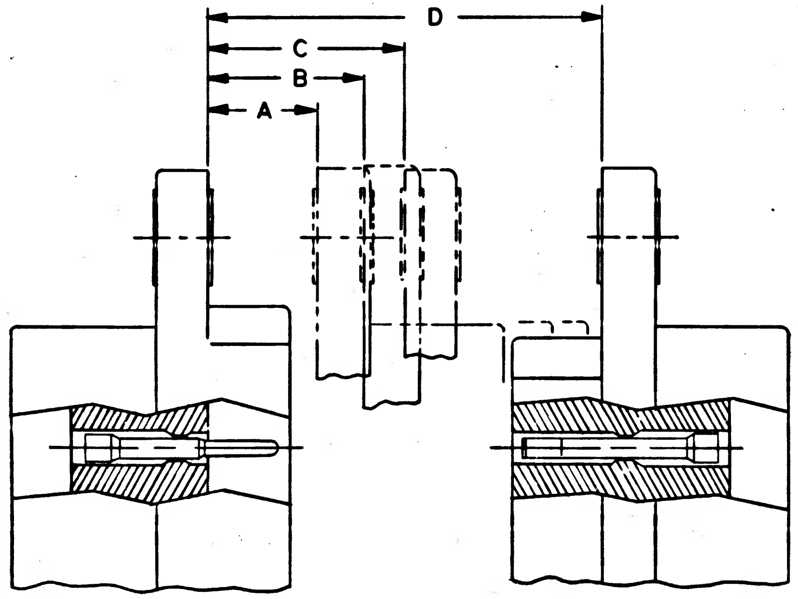
B 1010607 Ⓜ

REVISIONS TDRR 01592 13 June 1963

SYM	DESCRIPTION	DATE	APPROVAL
A	Ⓜ UPGRADED TO CLASS A RELEASE PER TDRR #2757	6/11/63	DM
B	REVISED PER TDRR 06533		WK

TABLE I

DASH NO.	DRAWING FIGURE NO.	DIM A	CONTACT TYPE
-1	1	.161 .151	SOCKET PER 1010738-2
-2	2	.161 .151	SOCKET PER 1010738-2



	JACKSCREW	RACK & PANEL HARDWARE
A (FULLY ENGAGED)	.220	.220
B (PIN DISENGAGED)	.350	.350
C (HEX DISENGAGED)	.390	.390
D (FULLY DISENGAGED)	1.020	1.020

MATES WITH 1010496

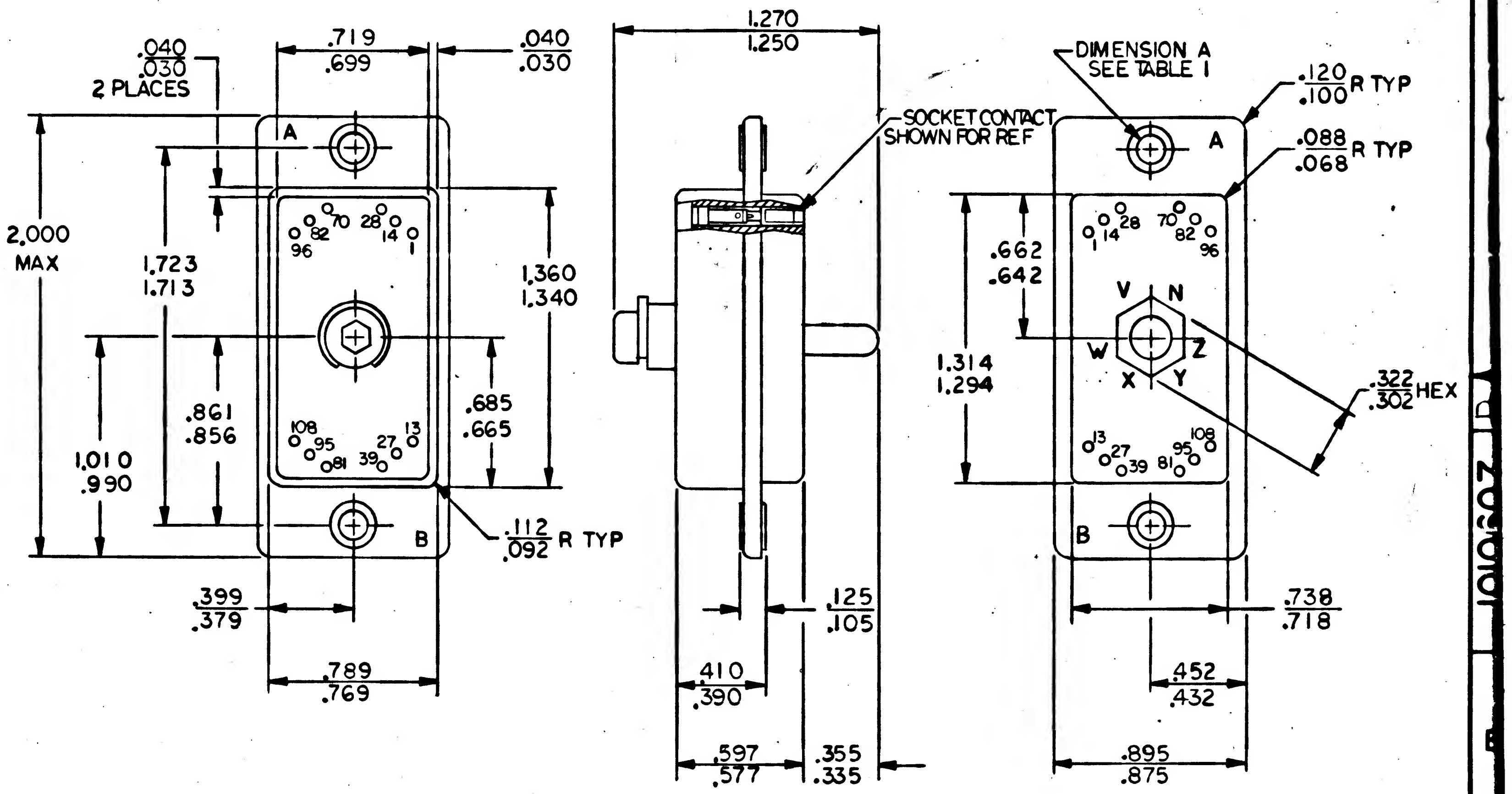


FIGURE 2

1010607-2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kane DATE 3 June 63
CHECKED G. Martz 6-11-63
APPROVAL 6/11/63
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, RECEPTACLE, ELECTRICAL
108 #22 SOCKET CONTACTS
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010607
SCALE NONE
WT
SHEET 2 OF 2

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

4 3 2 1

1010607 C

SYM	DESCRIPTION	DATE	APPROVAL
A	UPGRADED TO CLASS A PER TDRR 02757	8/2/63	
B	REVISED PER TDRR 06533		epk WR
C	REPLACED BY REV D WITH CHANGES PER TDRR 12504	4/12/65	WK.

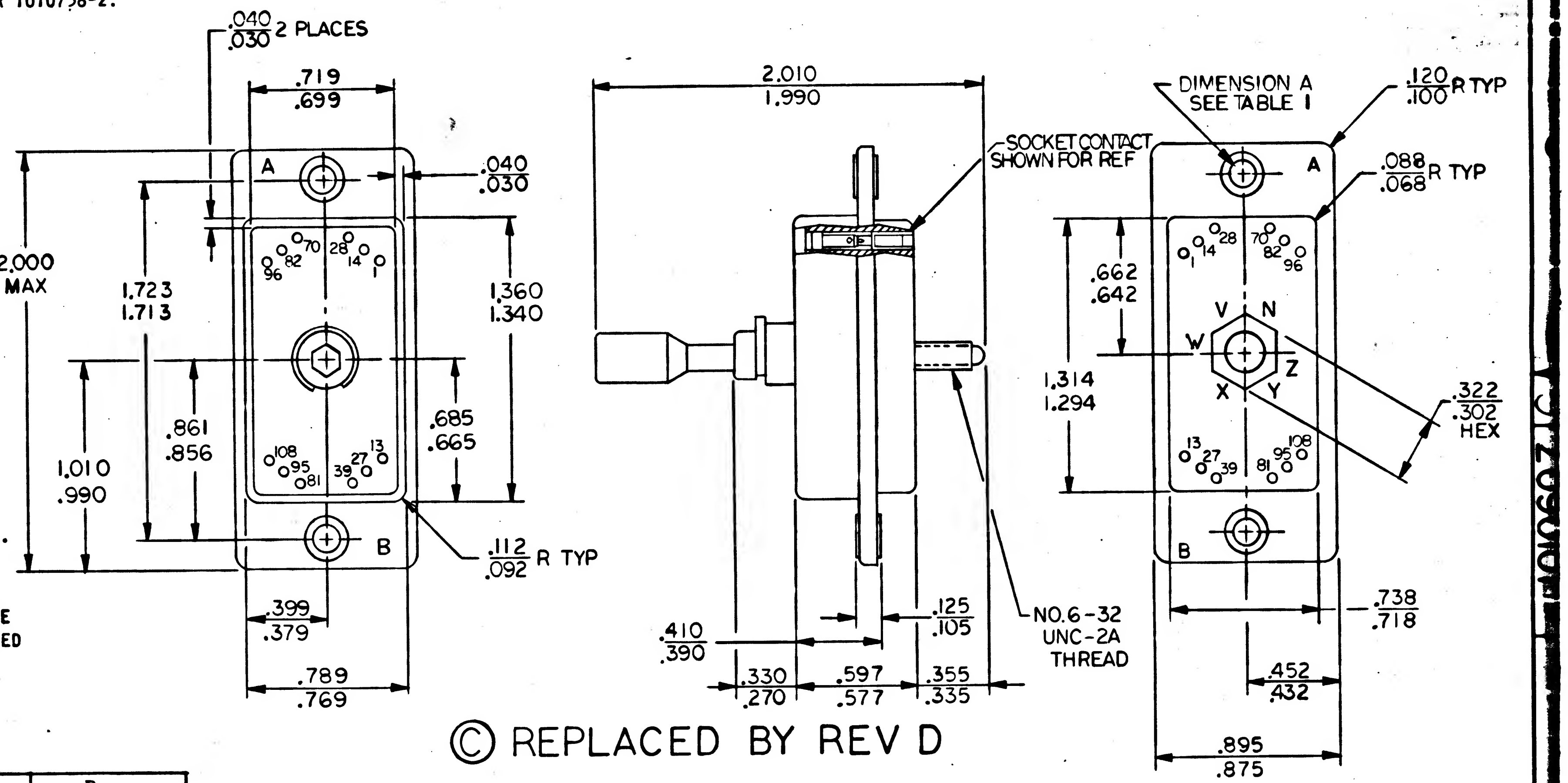
REVISIONS TDRR 01546 12 June 1963

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA DOCUMENT ND 1015404, CLASS 2.
   - C. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002052.
   - D. MARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH ND 1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, IDENTIFYING NUMBER, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.
   - E. CONNECTOR IS DESIGNED TO UTILIZE SOCKET CONTACTS PER 1010738-2.
2. ACCEPTANCE AND INSPECTION:
   - A. DIMENSIONS PER DRAWING.
3. DESIGN REQUIREMENTS:
   - A. MECHANICAL PROPERTIES:
     - (1) MATERIAL: BODY - DIALLYL PHTHALATE PER MIL-M-19833, TYPE SDI-5 OR GDI-30 F AS APPLICABLE.

       HARDWARE - ALIGNMENT AND MOUNTING HARDWARE SHALL BE NON MAGNETIC CORROSION RESISTANT STEEL, PASSIVATED.
   - B. ELECTRICAL CHARACTERISTICS:
     - (1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 160°F MEASURED BETWEEN TWO CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY CONTACT.
     - (2) DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 1500 VRMS. 90,000 TO 130,000 FT - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 250 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT.



Ⓒ REPLACED BY REV D

FIGURE I 1010607-1

B	B
A	A
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ± DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. DWG. NO. CONTRACT	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
MATERIAL SEE NOTES	DRAWN R. Kane DATE 3 JUNE 63 CHECKED A. Martz 6-11-63 APPROVAL 6/11/63 APPROVAL	CONNECTOR, RECEPTACLE, ELECTRICAL (108 #22 SOCKET CONTACTS) SPECIFICATION CONTROL DRAWING	
HEAT TREATMENT NONE	NASA APPROVAL Jack Barnard	CODE IDENT NO.	SIZE C
FINAL FINISH NONE	MIT APPROVAL Perry K. Bryant	SCALE NONE	WT

NASA DRAWING NO. 1010607

SHEET 1 OF 2

4 3 2 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

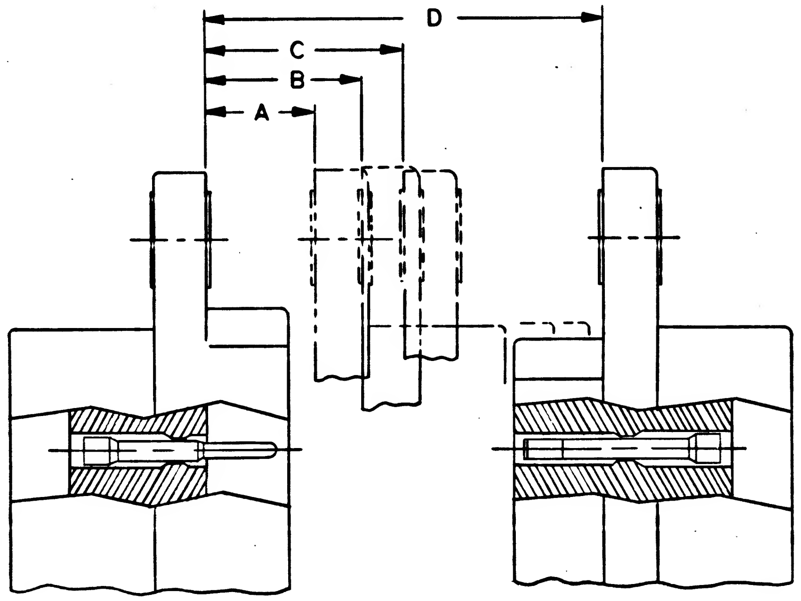
C 1010607 Ⓜ

REVISIONS TDRR 02757 13 June 1963

SYM	DESCRIPTION	DATE	APPROVAL
A	UPGRADED TO CLASS A RELEASE PER TDRR 02757	8/11/63	DW
B	REVISED PER TDRR 06533		WR
C	REPLACED BY REV D WITH CHANGES PER TDRR 12504	1/19/65	WK.

TABLE I

DASH NO.	DRAWING FIGURE NO.	DIM A	CONTACT TYPE
-1	1	.161 .151	SOCKET PER 1010738-2
-2	2	.161 .151	SOCKET PER 1010738-2



	JACKSCREW	RACK & PANEL HARDWARE
A (FULLY ENGAGED)	.220	.220
B (PIN DISENGAGED)	.350	.350
C (HEX DISENGAGED)	.390	.390
D (FULLY DISENGAGED)	1.020	1.020

MATES WITH 1010496

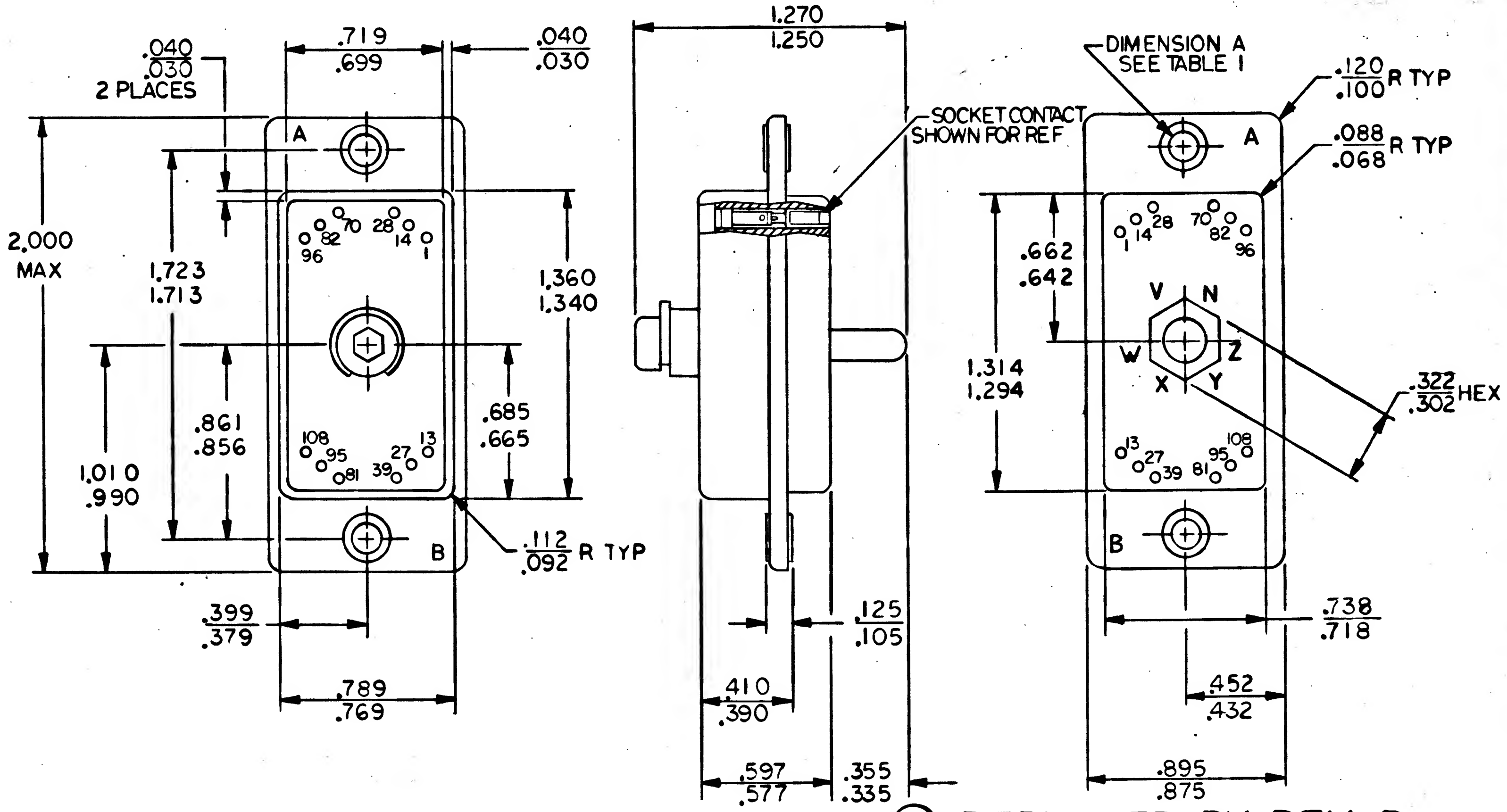


FIGURE 2

1010607-2

Ⓒ REPLACED BY REV D

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kane DATE 3 June 63
CHECKED G. Matz 6-11-63
APPROVAL 6/11/63
APPROVAL

NASA APPROVAL Jack Barnard
MIT APPROVAL Perry K Bryant

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, RECEPTACLE, ELECTRICAL
108 #22 SOCKET CONTACTS
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010607
SCALE NONE WT SHEET 2 OF 2

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
D	Ⓓ REPLACES REV. C WITH CHANGE PER TDRR 12504	1/19/65	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002052.
   - D. SOCKET CONTACTS ARE TO BE PROCURED SEPARATELY PER 1010738-2.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL:
       - (a) BODY: DIALLYLPHTHALATE PER MIL-P-19833, TYPE SDI-5 OR GDI-30F AS APPLICABLE. (UNPIGMENTED)
       - (b) HARDWARE:
         - POLARIZING BOSS: ALUMINUM ALLOY GRADE 7075T6 PER QQ-A-277-I
         - SPACER: BRASS QQ-B-626 COND II
         - RETAINING RING: MS-16632-28 PER MILITARY SPECIFICATION MIL-R-21248
         - JACKSCREW OR GUIDE PIN AND METAL INSERT CRES 303 OR 303 Se COND A OR B PER QQ-S-763.
     - (2) FINISH:
       - (a) HARDWARE:
         - POLARIZING BOSS: GRAY ANODIZE PER SPECIFICATION MIL-A-8625 CLASS 1
         - JACKSCREW OR GUIDE PIN AND METAL INSERT: PASSIVATE PER MIL-F-14702 FINISH NO. E-300. JACKSCREW IS LUBRICATED PER SPECIFICATION MIL-L-8937.
         - SPACER: NICKEL PLATE PER QQ-N-290.
         - POLARIZATION: NORMAL
     - (3) DIMENSIONS: AS PER DRAWING
     - (4) MARKING:
       - (a) PIECEMARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH ND 1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, MANUFACTURER'S LOT OR SERIAL NUMBER TRACEABLE TO DATE OF MANUFACTURE. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART.
       - (b) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME
         - NASA PART NUMBER AND REVISION LETTER
         - SUPPLIER'S LOT OR SERIAL NUMBER
       - (c) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL REQUIREMENTS WITH CONTACTS INSTALLED.
     - (1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 150°F MEASURED BETWEEN ANY TWO ADJACENT CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY ADJACENT CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202 METHOD 302, CONDITION C.
     - (2) DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 1500 VRMS. 90,000 TO 130,000 FT. - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 250 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301.
     - (3) VOLTAGE RATINGS (CONTACTS INSTALLED):

	VOLTS DC	VOLTS AC RMS
SEA LEVEL	490	350
10,000 FT.	390	280
60,000 FT.	140	100

   - B. MECHANICAL:
     - (1) CONTACT RETENTION FORCE:
       - a. WHEN CONTACTS ARE PROPERLY INSTALLED IN THEIR USING CONNECTOR, THEY SHALL BE CAPABLE OF SUPPORTING (WITHOUT DAMAGE) A MIN OF 15 LBS. AXIAL LOAD APPLIED IN EITHER DIRECTION.

DUPLICATE MASTER

Ⓓ REPLACES REV C WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
Contract NAS 9-497

DRAWN Bender DATE 20-JAN-64
CHECKED Ed Foster 22 JAN 64
APPROVAL Y. J. Kern 1/15/65
APPROVAL
NASA APPROVAL W J Rhine 1-19-65
MIT APPROVAL W. Crugler 19 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR-RECEPTACLE, ELECTRICAL
(FOR NO. 22 SOCKET CONTACTS)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010607
SCALE NONE
WT
SHEET 1 OF 3

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1010607 D

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
D	Ⓓ REPLACES REV. C WITH CHANGE PER TDRR 12504	4/19/65	

(REFERENCE)

	JACKSCREW	RACK & PANEL HARDWARE
A (FULLY ENGAGED)	.220	.220
B (PIN DISENGAGED)	.350	.350
C (HEX DISENGAGED)	.390	.390
D (FULLY DISENGAGED)	1.180	1.020

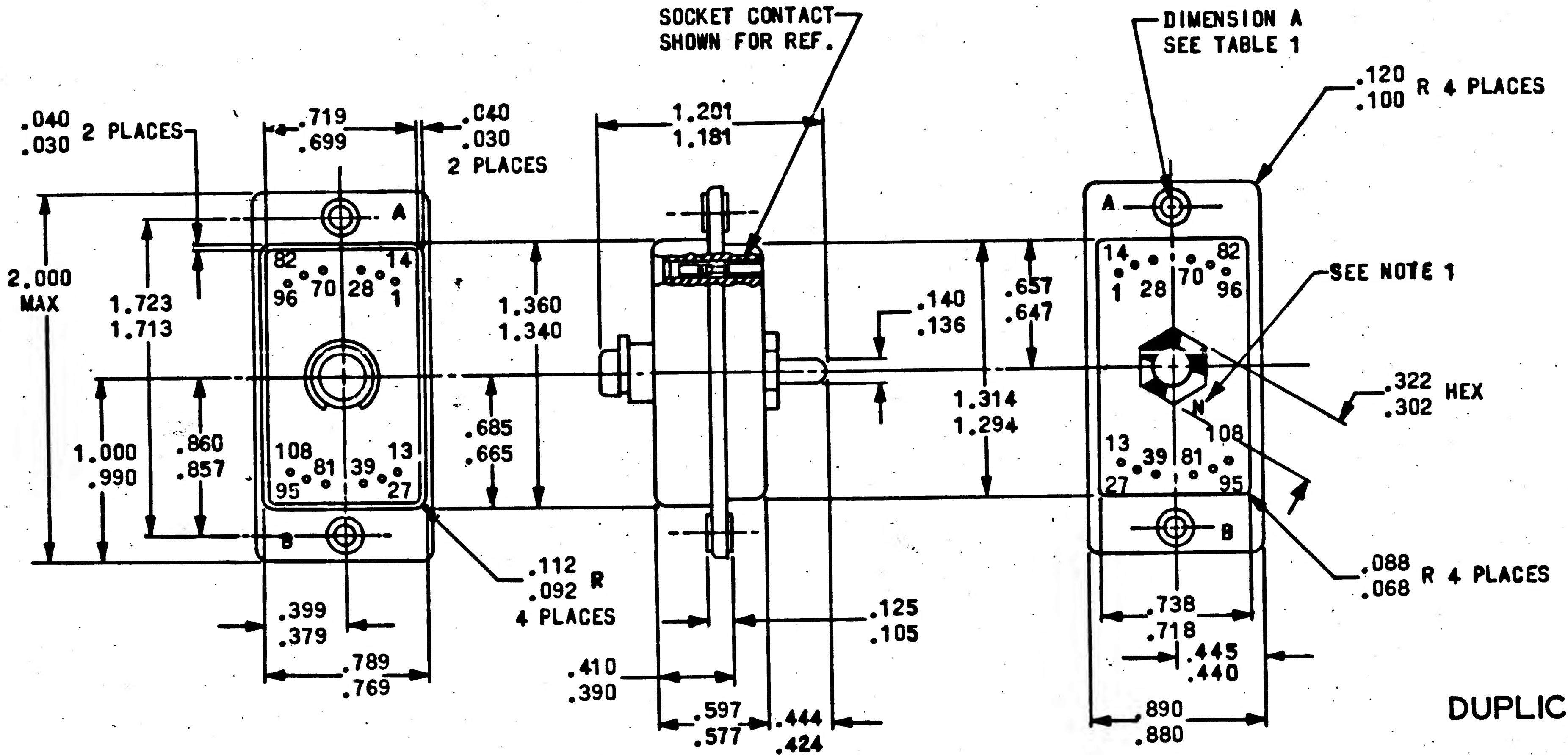
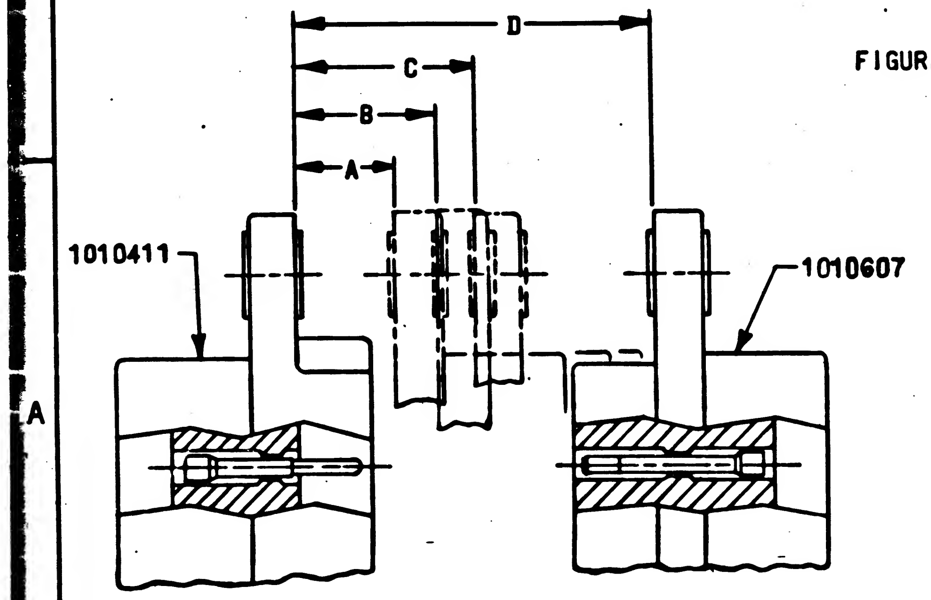


FIGURE 2 1010607-2



DUPLICATE MASTER

Ⓓ REPLACES REV C WITH CHANGE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO Contract NAS 9-497
DRAWN Bender DATE 20-JAN-64
CHECKED Ed Foster 22 JAN 64
APPROVAL 4/15/65
APPROVAL
NASA APPROVAL W J Rhine 1-19-65
MIT APPROVAL 19 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, RECEPTACLE, ELECTRICAL
(FOR NO. 22 SOCKET CONTACTS)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1010607
SCALE NONE | WT | SHEET 2 OF 3

4 3 2 1

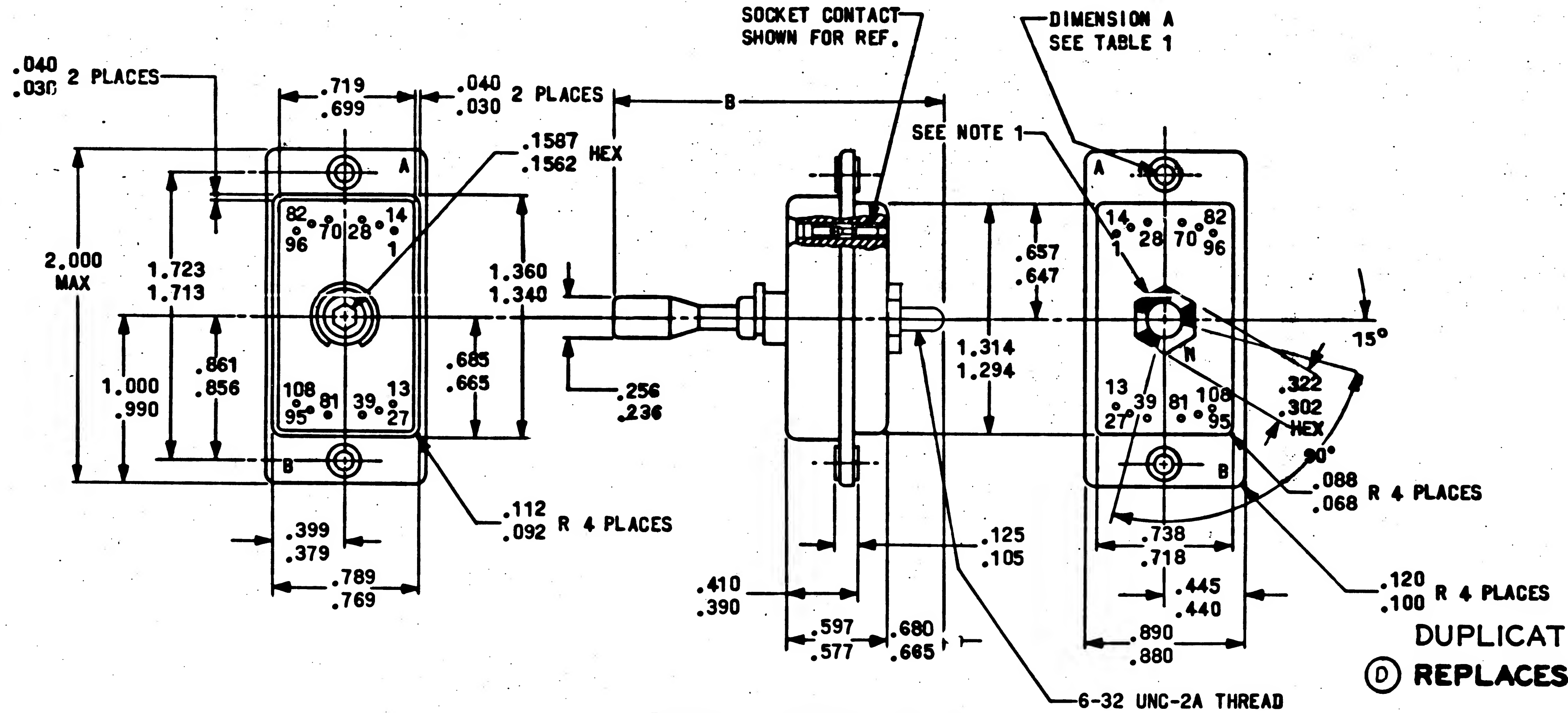
D	1010607

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
D	ⓐ REPLACES REV. C WITH CHANGE PER TDRR 12504	1/19/65	WK

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

NOTES:

1. SHADED AREAS INDICATE HIGH PORTIONS OF POLARIZING DEVICE.
LARGE NOTCH IS ADJACENT TO POLARIZATION LETTER REQUIRED.
POLARIZING BOSS SHOWN IN "N" POSITION



DUPLICATE MASTER

Ⓓ REPLACES REV C WITH CHANGE

FIGURE 1 1010607-1 AND -3

MASTER

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

TABLE I

DASH NO.	DRAWING FIGURE NO.	DIM A	SCREWLOCK DIM B	APPLICATION	CONTACT TYPE
-1	1	.161 .151	2.083 2.063	JACKSCREW	SOCKET PER 1010738-2
-2	2	.161 .151	NA	RACK & PANEL	
-3	1	.131 .121	2.828 2.808	JACKSCREW	

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497

DRAWN Bender DATE 20-JAN-64
CHECKED Ed Foster 22 JAN 64
APPROVAL 1/15/65
APPROVAL
NASA APPROVAL W J Rhine 1-19-65
MIT APPROVAL 19 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, RECEPTACLE, ELECTRICAL
(FOR NO. 22 SOCKET CONTACTS)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010607

SCALE NONE WT SHEET 3 OF 3

4 3 2 1

1010607

SYM	REVISIONS DESCRIPTION	DATE	APPROVAL

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 01546 **DATE** 12 June 1963

REQUIREMENTS:

1. GENERAL:

   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

   B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA DOCUMENT ND 1015404, CLASS 2.

   C. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002052.

   D. MARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-130 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, IDENTIFYING NUMBER, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

   E. CONTACTS PER 1010464, TO BE SUPPLIED LOOSE WITH CONNECTOR.

2. ACCEPTANCE AND INSPECTION:

   A. DIMENSIONS PER DRAWING.

3. DESIGN REQUIREMENTS:

   A. MECHANICAL PROPERTIES:

      (1) MATERIAL: BODY - DIALLYL PHTHALATE PER MIL-M-19833, TYPE SDI-5 OR GDI-30 AS APPLICABLE.

      CONTACTS - 1/2 HARD BRASS GOLD PLATED PER MIL-G-45204, TYPE 2, CLASS 1.

      HARDWARE - ALIGNMENT AND MOUNTING HARDWARE SHALL BE NON MAGNETIC CORROSION RESISTANT STEEL, PASSIVATED.

   B. ELECTRICAL CHARACTERISTICS:

      (1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 160°F MEASURED BETWEEN TWO CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY CONTACT.

      (2) DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 1500 VRMS. 90,000 TO 130,000 FT - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 250 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT.

      (3) CONTACT MATERIAL RESISTANCE: 0.003 OHMS, MAXIMUM.

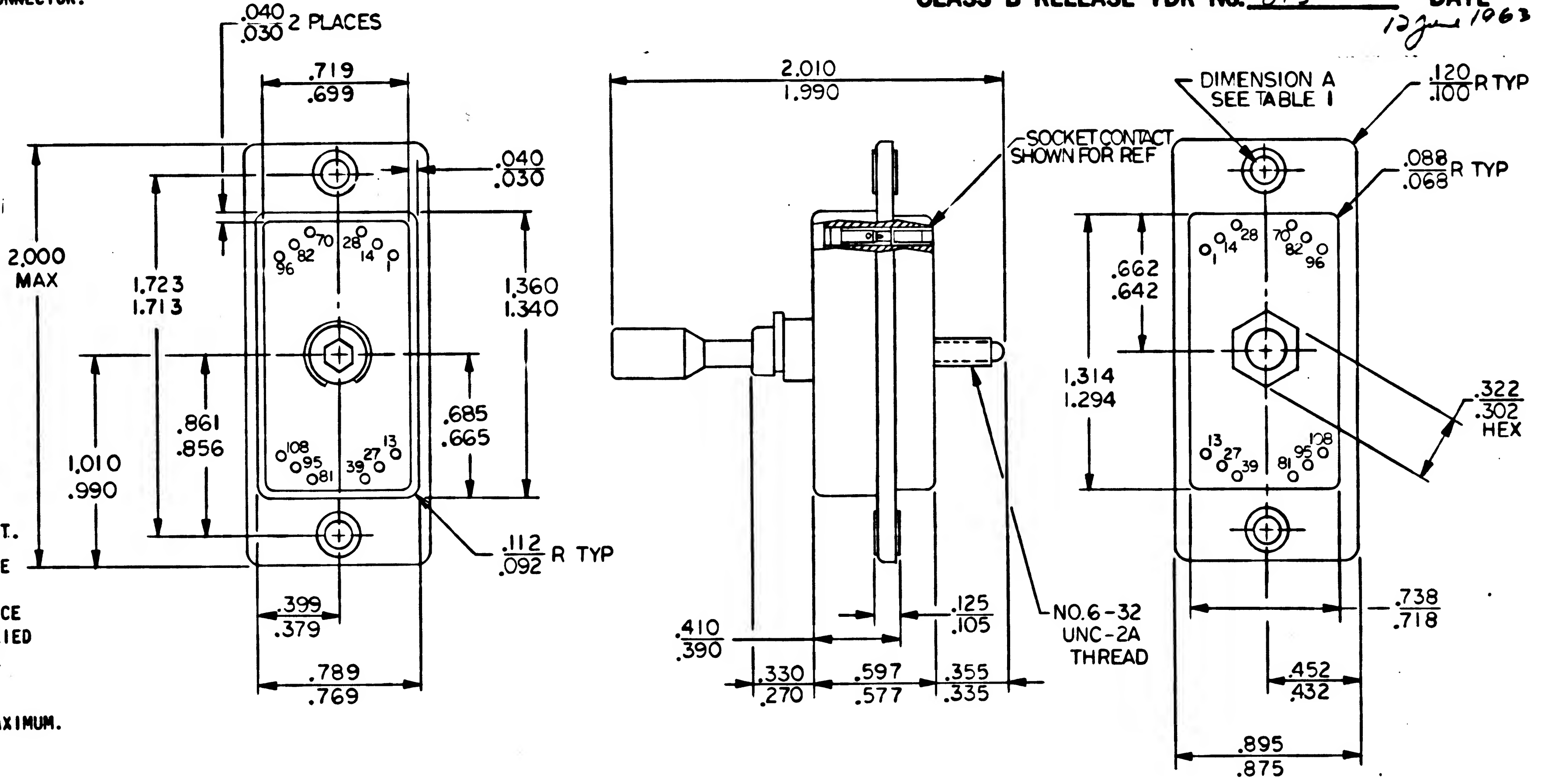


FIGURE 1 1010607-1

SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kone DATE 3 June 63
CHECKED A. Martz 6-11-63
APPROVAL 6/11/63
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL Perry K. Bryant

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, RECEPTACLE, ELECTRICAL
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010607
SCALE NONE WT SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010607

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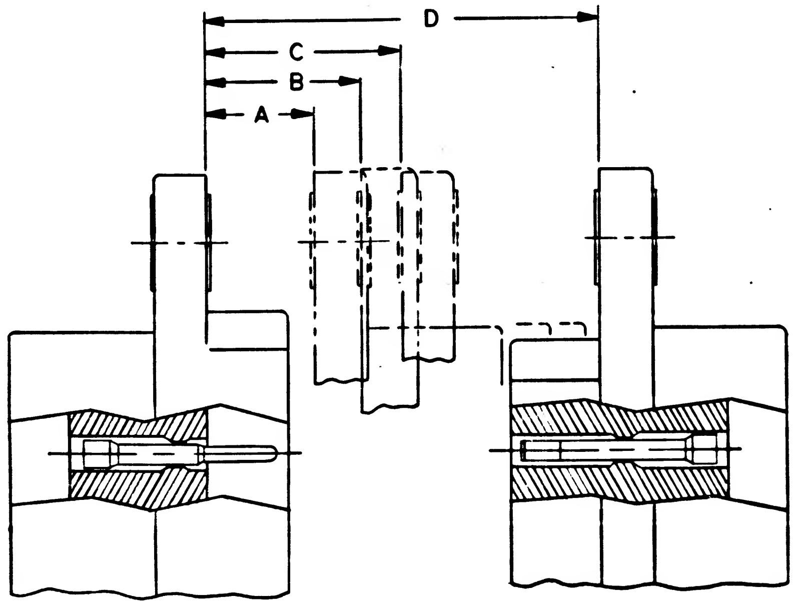
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL

TABLE I

DASH NO.	DRAWING FIGURE NO.	DIM A	CONTACT TYPE
-1	1	.161 .151	SOCKET PER 1010464-2
-2	2	.161 .151	SOCKET PER 1010464-2

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 01546 **DATE** 12 June 1963



	JACKSCREW	RACK & PANEL HARDWARE
A (FULLY ENGAGED)	.220	.220
B (PIN DISENGAGED)	.350	.350
C (HEX DISENGAGED)	.390	.390
D (FULLY DISENGAGED)	1.020	1.020

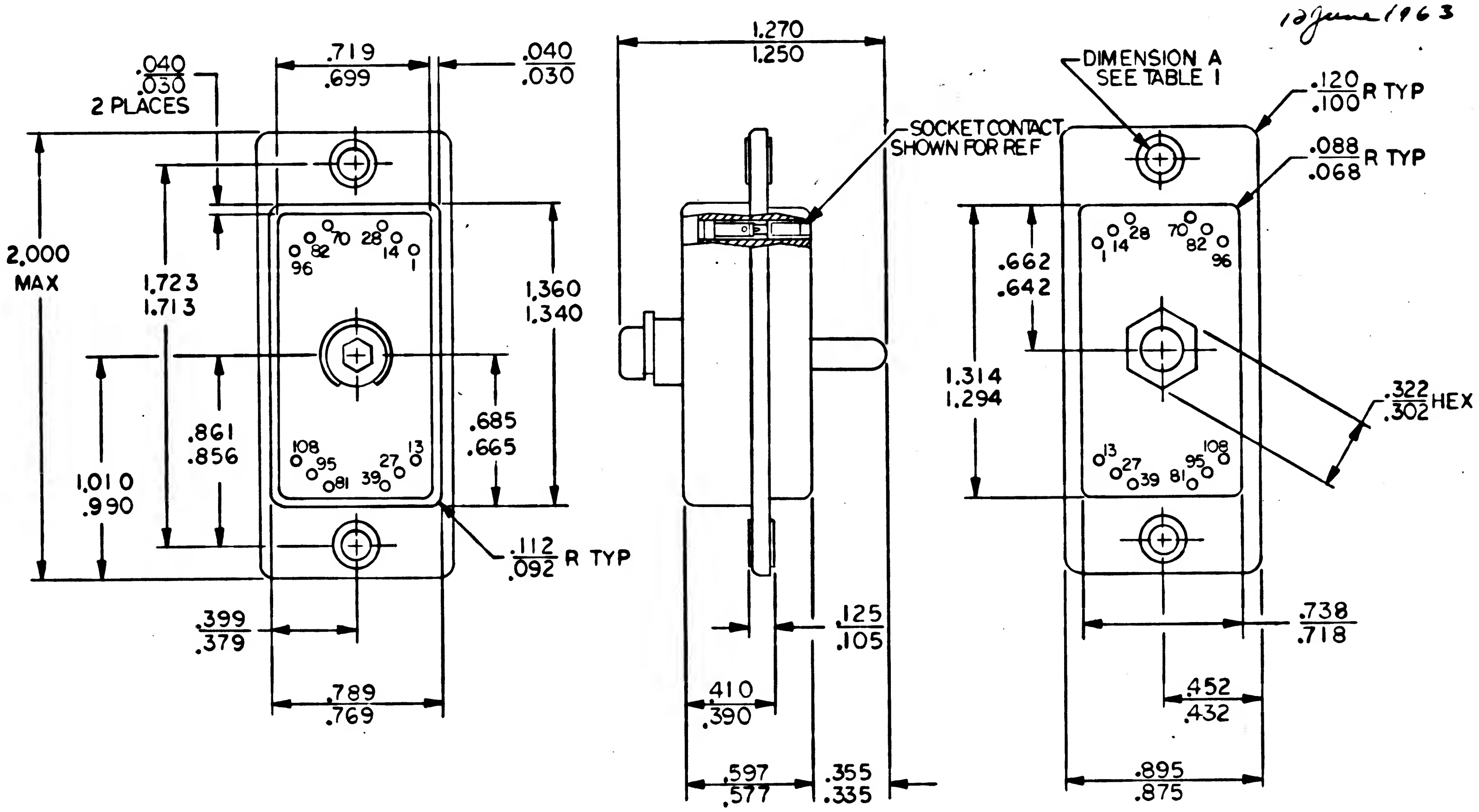


FIGURE 2

1010607-2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kane DATE 3 June 63
CHECKED G. Martz 6-11-63
APPROVAL 6/11/63
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, RECEPTACLE, ELECTRICAL
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010607
SCALE NONE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

—	8090101

REVISIONS			
SYM	DESCRIPTION	DATE	APPD.
-	INITIAL RELEASE CLASS A PER TDRR 02337	7/31/63	

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

INSPECTION AND ACCEPTANCE:

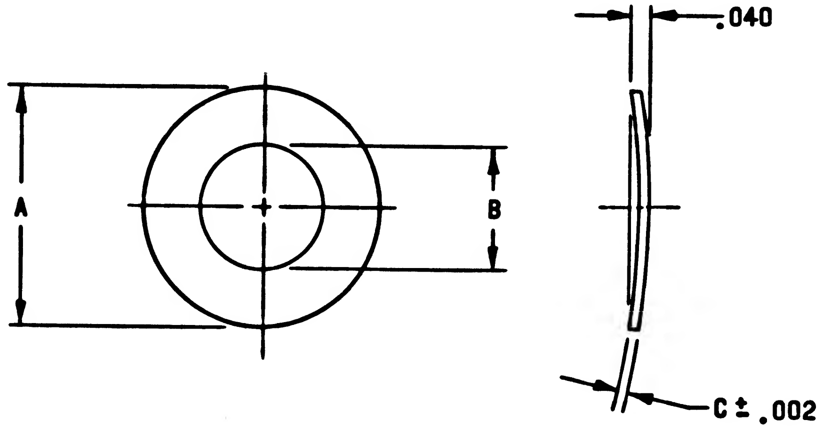
MATERIAL: BERYLLIUM COPPER (BERYLCO 25 OR EQUIV.) PER FED-SPEC QQ-C-533. HEAT TREAT AFTER FORMING AT 600° ± 10°F FOR 2 HOURS. (1/2 H.T. COND.)

FINISH: NICKEL PLATE PER QQ-N-290, CLASS 1, TYPE VI.

DESIGN REQUIREMENTS:

SPRING DELIVERS 2 TO 4 LBS. AT .020 COMPRESSION.

NASA PART NUMBER	A OD	B ID	C THICKNESS
1010608-1	.252	.129	.006



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	+.005	+ —
— —	-.005	— —

DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
CONTRACT

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN E. Miller DATE 9 MAY 63
CHECKED 13 May 63
APPROVAL E A Woodin 7-30-63
APPROVAL
NASA APPROVAL W. J. Rhine 7-31-63
MIT APPROVAL 7/31/63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WASHER, SPRING, CURVED

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C 1010608
SCALE — SHEET 1 OF 1

1010608

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

6090101

REVISIONS			
SYM	DESCRIPTION	DATE	APPD.
-	INITIAL RELEASE CLASS A PER TDRR 02337	7/31/63	

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

INSPECTION AND ACCEPTANCE:

MECHANICAL REQUIREMENTS:

ENDS: SQUARED AND GROUND. ENDS TO BE SQUARE WITHIN 3° WITH THE AXIS. O.D. SIZES .057 TO .093 HAVE SQUARED ENDS NOT GROUND.

DIMENSIONS: SHALL BE AS SHOWN.

DIRECTION OF WIND SHALL BE OPTIONAL FOR THE MANUFACTURER.

MARKING: PIECEMARK PER MIL-STD-130. UNIT PACKAGES SHALL BE MARKED WITH THE NASA PART NUMBER (1010609) AND REV LETTER.

DESIGN REQUIREMENTS:

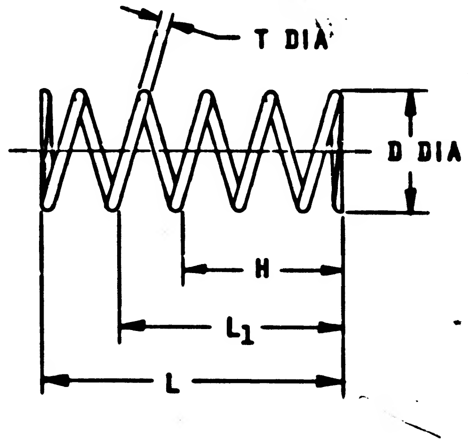
MATERIAL: CORROSION RESISTANT STEEL PER QQ-W-423, COMPOSITION FS-302.

FINISH: PASSIVATE PER MIL-F-14072, E 300

LOAD VALUES SHOWN ARE BASED ON A SERVICE LIFE OF 50,000 CYCLES. FOR NORMAL SERVICE, SPRINGS SHOULD NOT BE COMPRESSED BELOW L.

NUMBER OF TURNS OPTIONAL.

NASA PART NUMBER	D DIA.		WIRE DIA T (REF)	FREE LENGTH L (REF)	SOLID HEIGHT H (MAX)	LOAD AT LENGTH		SPRING RATE R (LB/IN) ± 10%
	NOM.	TOL.				P (LB.) ± 10%	L_1	
1010609-1	.120	±.005	.022	.562	.342	3.73	.401	23.5



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS NAS9 CONTRACT 497	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
APPLICATION		DO NOT SCALE THIS DRAWING	DRAWN P. FOSTER DATE 11 JUNE 63 CHECKED Wilson 12 June 63 APPROVAL E A Woodin 7-29-63 APPROVAL	SPRING, COMPRESSION SPECIFICATION CONTROL DRAWING
		MATERIAL SEE NOTES	NASA APPROVAL W.J. Rhine 7-31-63	CODE IDENT NO. — SIZE C — 1010609
		CONTRACT	MIT APPROVAL 7/31/63	SCALE — SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 04403	5 MAR 65	WK

REVISIONS TDRR 01656

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

NOTES:

1. GENERAL REQUIREMENTS:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. UNITS SHALL MEET THE GENERAL REQUIREMENT OF ND 1002016.
   - C. MANUFACTURER SHALL COMPLY WITH THE QUALITY ASSURANCE PROVISIONS OF ND 1015404, CLASS 1.
   - D. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002053.
   - E. PARTS SHALL BE PACKAGED ACCORDING TO BEST COMMERCIAL PRACTICE SUCH THAT THE SHAFT AND CRITICAL DIAMETERS SHALL BE ADEQUATELY PROTECTED FROM DAMAGE. MANUFACTURER'S NAME AND/OR SYMBOL, PART NUMBER, NASA DWG. NO. AND REV. LETTER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE REAR OF THE END CAP, THE OUTSIDE CASE DIAMETER BEING CLEAR OF MARKING. EACH CONTAINER SHALL INCLUDE THE NASA DRAWING NUMBER AND REVISION.

2. ACCEPTANCE AND INSPECTION REQUIREMENTS (100%):
   - A. MECHANICAL PROPERTIES:
     - (1) LEADS: EXIT HOLES IN LINE WITHIN 5° OF EACH OTHER. LEADS SHALL BE POLYTETRAFLUOROETHYLENE (TFE) INSULATED AND COLOR CODED PER MIL-W-16878, E26 EXCEPT THE BLUE HI-OUTPUT GENERATOR LEAD SHALL BE SHIELDED ONE-CONDUCTOR WITH A BLUE TFE JACKET. SHIELD SHALL BE GROUNDED TO SERVO MOTOR FRAME.
     - (2) SHAFT TOLERANCES, DYNAMIC: RUNOUT OF DIAMETER A SHALL BE .0005 TIR MAXIMUM WHEN UNIT IS IN THE VERTICAL POSITION SUSPENDED BY THE SHAFT. SHAFT END PLAY SHALL BE BETWEEN .0005 AND .0030 UNDER A 16 ± 1 OUNCE REVERSING GAUGE LOAD. SHAFT RADIAL PLAY SHALL BE .0007 TIR MAXIMUM AT A POINT .125 MAXIMUM FROM THE CASE UNDER AN 8.0 ± 0.5 OUNCE REVERSING GAUGE LOAD APPLIED TO A POINT .250 MAXIMUM FROM THE CASE.
     - (3) GEAR DESIGN DATA:

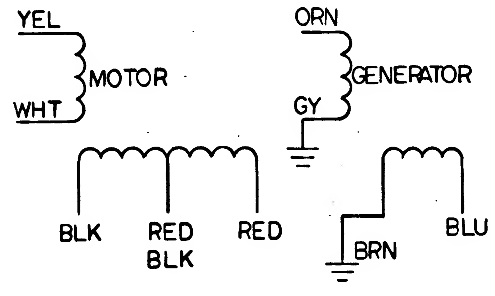
NUMBER OF TEETH	13
DIAMETRAL PITCH	120
PRESSURE ANGLE	20°
STANDARD PITCH DIAMETER	.1083
AGMA QUALITY CLASS	PREC. 1
OUTSIDE DIAMETER	$.1247 {}^{+.0000}_{-.0010}$
GEAR TEETH FINISH	32

   - B. ELECTRICAL TESTS:
     - (1) UNITS SHALL MEET THE REQUIREMENTS OF ND 1002195.

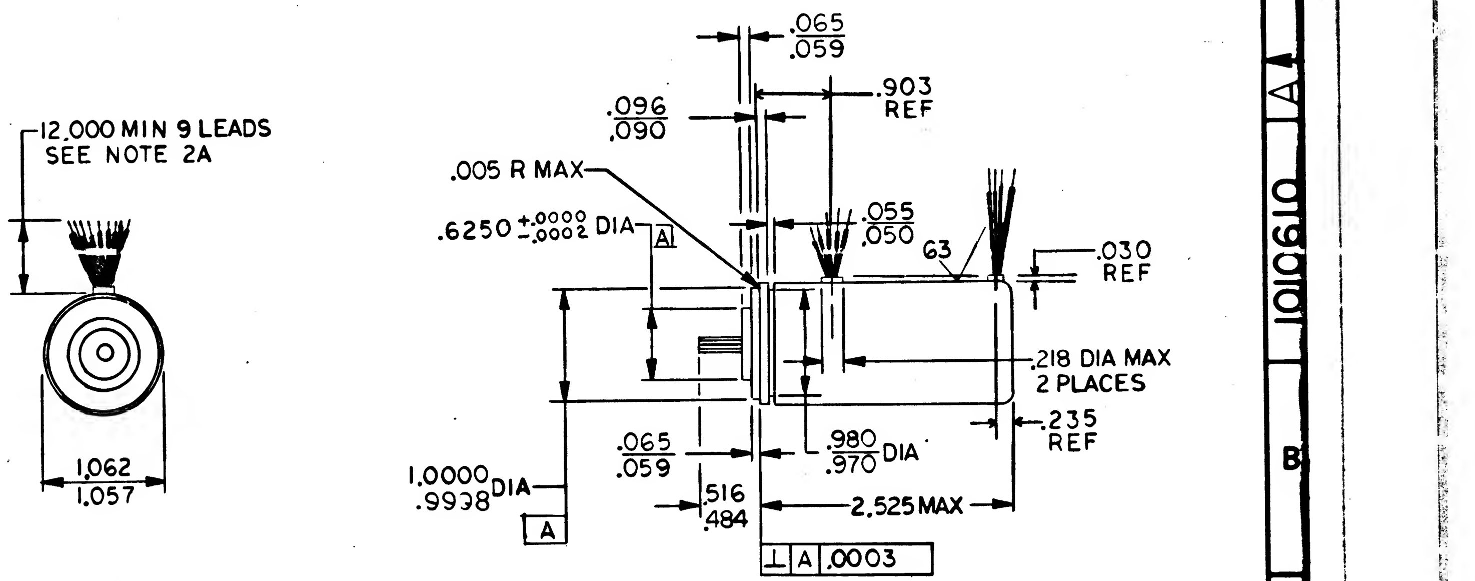
3. DESIGN REQUIREMENTS:
   - A. OPERATING LIFE: 2000 HRS PER ND 1002016.
   - B. STORAGE LIFE: 5 YEARS WITH NO DETERIORATION OF THE INSULATION OR LUBRICANT.
   - C. CONSTRUCTION:
     - (1) MATERIAL: CASE AND SHAFT SHALL BE CORROSION-RESISTING STEEL IN ACCORDANCE WITH QQ-S-763, CLASS 416, COND T.
     - (2) FINISH: PASSIVATED IN ACCORDANCE WITH MIL-F-14072, E 300.
     - (3) LUBRICATION: BEARINGS SHALL BE LUBRICATED WITH LUBRICANT SPECIFIED IN ND 1002077, OR GE F-50 SILICONE OIL OR EQUIVALENT.
     - (4) ROTOR INERTIA: THE ROTOR INERTIA SHALL BE 5.5 gm-cm² ± 20%.
   - D. ENVIRONMENTAL
     - (1) REQUIREMENTS ABOVE AT 25°C AMBIENT TEMPERATURE.
     - (2) GENERATOR OUTPUT WINDING SHALL NOT EXCEED +165°C AS MEASURED PER ND 1002016.

4. SPECIAL REQUIREMENTS: SUPPLIERS FINAL INSPECTION DETAIL PERFORMANCE DATA SHALL BE SUPPLIED WITH THE PRODUCT.

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.



WIRING DIAGRAM



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kane DATE 17 June 63
CHECKED A Marts 6-18-63
APPROVAL R.J. Thissen 6-18-63
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SERVO MOTOR-
TACHOMETER, GENERATOR
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010610
SCALE NONE WT .438 LBS MAX SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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B 0190101

REVISIONS TDRR 01656			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 04403	5 Mar 63	wk
B	REVISED PER TDRR 07025	3/24/64	wk

NOTES:

1. GENERAL REQUIREMENTS:

   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

   B. UNITS SHALL MEET THE GENERAL REQUIREMENT OF ND 1002016.

   C. MANUFACTURER SHALL COMPLY WITH THE QUALITY ASSURANCE PROVISIONS OF ND 1015404, CLASS 1.

   D. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002053.

   E. PARTS SHALL BE PACKAGED ACCORDING TO BEST COMMERCIAL PRACTICE SUCH THAT THE SHAFT AND CRITICAL DIAMETERS SHALL BE ADEQUATELY PROTECTED FROM DAMAGE. MANUFACTURER'S NAME AND/OR SYMBOL, PART NUMBER, NASA DWG. NO. AND REV. LETTER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE REAR OF THE END CAP, THE OUTSIDE CASE DIAMETER BEING CLEAR OF MARKING. EACH CONTAINER SHALL INCLUDE THE NASA DRAWING NUMBER AND REVISION PER ND 1002019

2. ACCEPTANCE AND INSPECTION REQUIREMENTS (100%):

   A. MECHANICAL PROPERTIES:

      (1) LEADS: EXIT HOLES IN LINE WITHIN 5° OF EACH OTHER. LEADS SHALL BE POLYTETRAFLUOROETHYLENE (TFE) INSULATED AND COLOR CODED PER MIL-W-16878, E26 EXCEPT THE BLUE HI-OUTPUT GENERATOR LEAD SHALL BE SHIELDED ONE-CONDUCTOR WITH A BLUE TFE JACKET. SHIELD SHALL BE GROUNDED TO SERVO MOTOR FRAME.

      (2) SHAFT TOLERANCES, DYNAMIC: RUNOUT OF DIAMETER A SHALL BE .0005 TIR MAXIMUM WHEN UNIT IS IN THE VERTICAL POSITION SUSPENDED BY THE SHAFT. SHAFT END PLAY SHALL BE BETWEEN .0010 AND .0030 UNDER A 16 ± 1 OUNCE REVERSING GAUGE LOAD. SHAFT RADIAL PLAY SHALL BE .0007 TIR MAXIMUM AT A POINT .125 MAXIMUM FROM THE CASE UNDER AN 8.0 ± 0.5 OUNCE REVERSING GAUGE LOAD APPLIED TO A POINT .250 MAXIMUM FROM THE CASE.

      (3) ROTOR INERTIA: THE ROTOR INERTIA SHALL BE 5.5 gm-cm^2 ± 20%.

      (3) GEAR DESIGN DATA:

NUMBER OF TEETH	13
DIAMETRAL PITCH	120
PRESSURE ANGLE	20°
STANDARD PITCH DIAMETER	.1083
AGMA QUALITY CLASS	PREC. 1
OUTSIDE DIAMETER	$.1247 {}^{+.0000}_{-.0010}$
GEAR TEETH FINISH	32

   B. ELECTRICAL TESTS:

      (1) UNITS SHALL MEET THE REQUIREMENTS OF ND 1002195.

3. DESIGN REQUIREMENTS:

   A. OPERATING LIFE: 2000 HRS PER ND 1002016.

   B. STORAGE LIFE: 5 YEARS WITH NO DETERIORATION OF THE INSULATION OR LUBRICANT.

   C. CONSTRUCTION:

      (1) MATERIAL: CASE AND SHAFT SHALL BE CORROSION-RESISTING STEEL IN ACCORDANCE WITH QQ-S-763, CLASS 416, COND T.

      (2) FINISH: PASSIVATED IN ACCORDANCE WITH MIL-F-14072, E 300.

      (3) LUBRICATION: BEARINGS SHALL BE LUBRICATED WITH LUBRICANT SPECIFIED IN ND 1002077, OR GE F-50 SILICONE OIL OR EQUIVALENT.

      (4) ROTOR INERTIA: THE ROTOR INERTIA SHALL BE 5.5 gm-cm^2 ± 20%.

   D. ENVIRONMENTAL

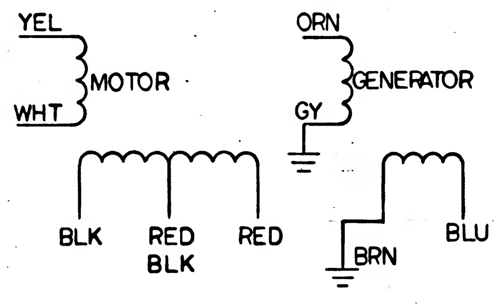
      (1) REQUIREMENTS ABOVE AT 25°C AMBIENT TEMPERATURE.

      (2) GENERATOR OUTPUT WINDING SHALL NOT EXCEED +165°C AS MEASURED PER ND 1002016.

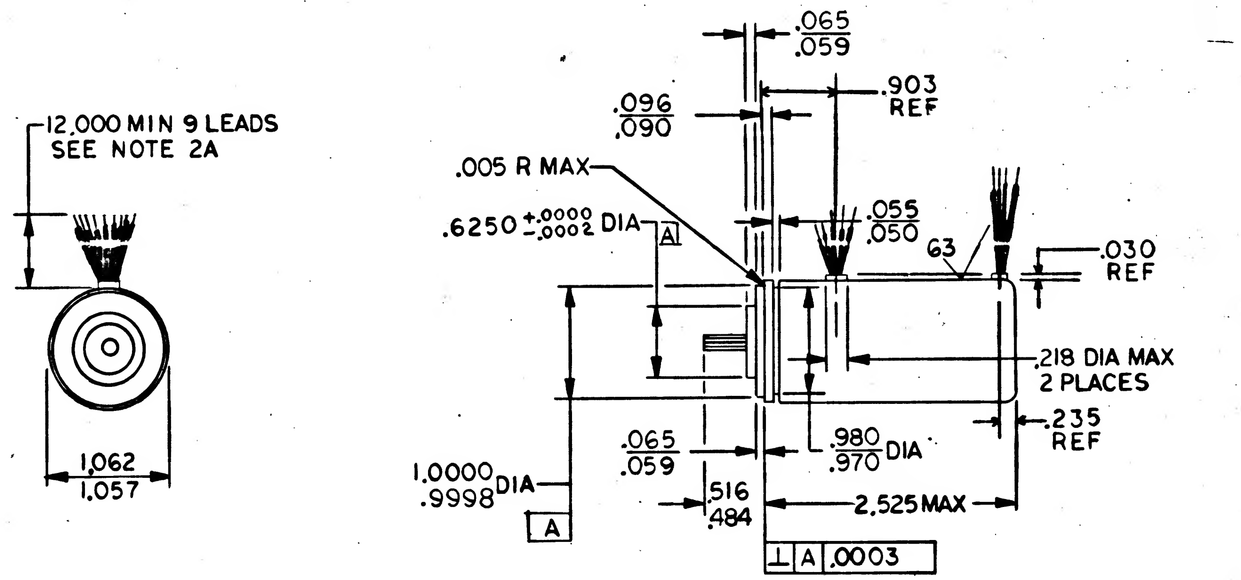
4. SPECIAL REQUIREMENTS: SUPPLIERS FINAL INSPECTION DETAIL PERFORMANCE DATA SHALL BE SUPPLIED WITH THE PRODUCT.

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER



WIRING DIAGRAM



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTES
HEAT TREATMENT
NONE
FINAL FINISH
NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 17 June 63
CHECKED A. Marti 6-18-63
APPROVAL R. J. Thissim 6-18-63
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SERVO MOTOR—
TACHOMETER, GENERATOR
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010610
SCALE NONE WT .438 LBS MAX SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

C 0190101

REVISIONS TDRR 01656

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 04403	5 Mar 63	wk
B	REVISED PER TDRR 07025	3/24/64	wk
C	REVISED PER TDRR 11114	7/28/64	wk

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NOTES:

1. GENERAL REQUIREMENTS:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. UNITS SHALL MEET THE GENERAL REQUIREMENT OF ND 1002016.
   - C. MANUFACTURER SHALL COMPLY WITH THE QUALITY ASSURANCE PROVISIONS OF ND 1015404, CLASS 1.
   - D. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002053.
   - E. [illegible]

     MANUFACTURER'S NAME AND/OR SYMBOL, PART NUMBER, NASA DWG. NO. AND REV. LETTER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE REAR OF THE END CAP, THE OUTSIDE CASE DIAMETER BEING CLEAR OF MARKING. EACH CONTAINER SHALL INCLUDE THE NASA DRAWING NUMBER AND REVISION PER ND 1002019

2. ACCEPTANCE AND INSPECTION REQUIREMENTS (100%):
   - A. MECHANICAL PROPERTIES:
     - (1) LEADS: EXIT HOLES IN LINE WITHIN 5° OF EACH OTHER. LEADS SHALL BE POLYTETRAFLUOROETHYLENE (TFE) INSULATED AND COLOR CODED PER MIL-W-16878, E26 EXCEPT THE BLUE HI-OUTPUT GENERATOR LEAD SHALL BE SHIELDED ONE-CONDUCTOR WITH A BLUE TFE JACKET. SHIELD SHALL BE GROUNDED TO SERVO MOTOR FRAME.
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     - (3) GEAR DESIGN DATA:

NUMBER OF TEETH	13
DIAMETRAL PITCH	120
PRESSURE ANGLE	20°
STANDARD PITCH DIAMETER	.1083
AGMA QUALITY CLASS	PREC. 1
OUTSIDE DIAMETER	$.1247 {}^{+.0000}_{-.0010}$
GEAR TEETH FINISH	32

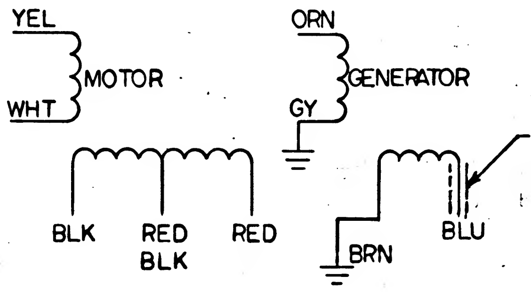
   - B. ELECTRICAL TESTS:
     - (1) UNITS SHALL MEET THE REQUIREMENTS OF ND 1002195. EXCEPT FOR AXIS ERROR (¶ 3.5.B.b.2b) SHALL BE PER TABLE I

3. DESIGN REQUIREMENTS:
   - A. OPERATING LIFE: 2000 HRS PER ND 1002016.
   - B. STORAGE LIFE: 5 YEARS WITH NO DETERIORATION OF THE INSULATION OR LUBRICANT.
   - C. CONSTRUCTION:
     - (1) MATERIAL: CASE AND SHAFT SHALL BE CORROSION-RESISTING STEEL IN ACCORDANCE WITH QQ-S-763, CLASS 416, COND T.
     - (2) FINISH: PASSIVATED IN ACCORDANCE WITH MIL-F-14072, E 300.
     - (3) LUBRICATION: BEARINGS SHALL BE LUBRICATED WITH LUBRICANT SPECIFIED IN ND 1002077.
     - (4) ROTOR INERTIA: THE ROTOR INERTIA SHALL BE 5.5 gm-cm² ± 20%.
   - D. ENVIRONMENTAL
     - (1) REQUIREMENTS ABOVE AT 25°C AMBIENT TEMPERATURE.
     - (2) GENERATOR OUTPUT WINDING SHALL NOT EXCEED +165°C AS MEASURED PER ND 1002016.

4. SPECIAL REQUIREMENTS: SUPPLIERS FINAL INSPECTION DETAIL PERFORMANCE DATA SHALL BE SUPPLIED WITH THE PRODUCT.

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

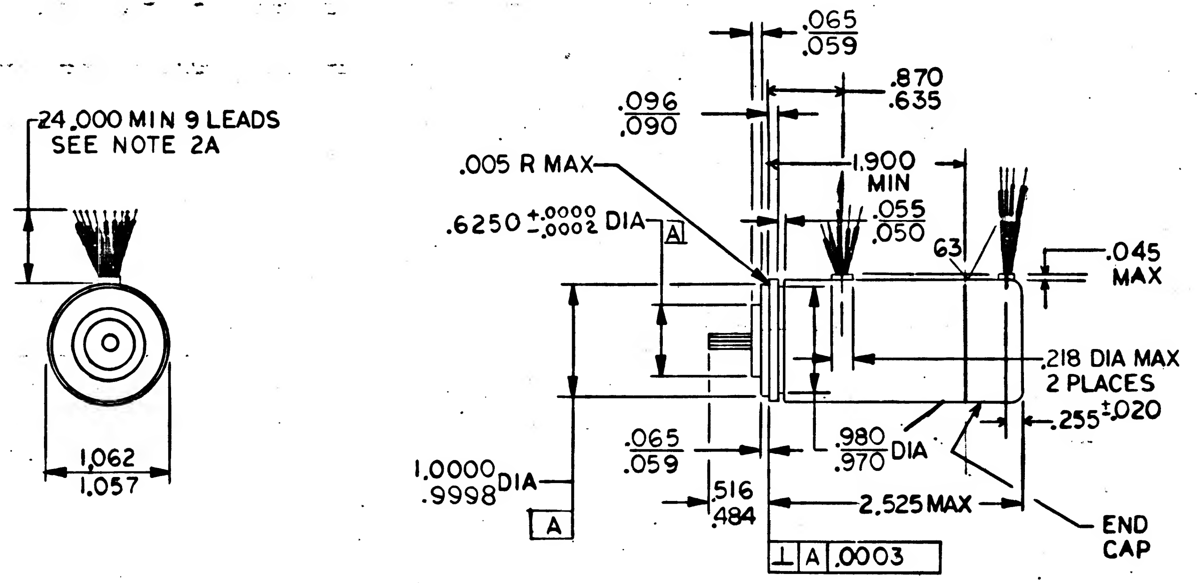
MASTER



WIRING DIAGRAM

TABLE I

PART NO	AXIS ERROR
1010610-1	2MV MAX
1010610-2	4MV MAX



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT

DRAWN R. Kane DATE 17 June 63
CHECKED A Marts 6-18-63
APPROVAL R.J. Thurston 6-18-63
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SERVO MOTOR-
TACHOMETER, GENERATOR
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010610
SCALE NONE
WT .438 LBS MAX
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

0190101

REVISIONS TDRR 01656

SYM	DESCRIPTION	DATE	APPROVAL

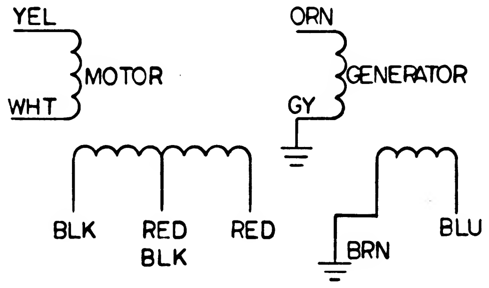
NOTES:

1. GENERAL REQUIREMENTS:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. UNITS SHALL MEET THE GENERAL REQUIREMENT OF ND 1002016.
   - C. MANUFACTURER SHALL COMPLY WITH THE QUALITY ASSURANCE PROVISIONS OF ND 1015404, CLASS 1.
   - D. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002053.
   - E. PARTS SHALL BE PACKAGED ACCORDING TO BEST COMMERCIAL PRACTICE SUCH THAT THE SHAFT AND CRITICAL DIAMETERS SHALL BE ADEQUATELY PROTECTED FROM DAMAGE. MANUFACTURER'S NAME AND/OR SYMBOL, PART NUMBER, NASA DWG. NO. AND REV. LETTER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE REAR OF THE END CAP, THE OUTSIDE CASE DIAMETER BEING CLEAR OF MARKING. EACH CONTAINER SHALL INCLUDE THE NASA DRAWING NUMBER AND REVISION.
2. ACCEPTANCE AND INSPECTION REQUIREMENTS (100%):
   - A. MECHANICAL PROPERTIES:
     - (1) LEADS: EXIT HOLES IN LINE WITHIN 5° OF EACH OTHER. LEADS SHALL BE POLYTETRAFLUOROETHYLENE (TFE) INSULATED AND COLOR CODED PER MIL-W-16878, E26 EXCEPT THE BLUE HI-OUTPUT GENERATOR LEAD SHALL BE SHIELDED ONE-CONDUCTOR WITH A BLUE TFE JACKET. SHIELD SHALL BE GROUNDED TO SERVO MOTOR FRAME.
     - (2) SHAFT TOLERANCES, DYNAMIC: RUNOUT OF DIAMETER A SHALL BE .0005 TIR MAXIMUM WHEN UNIT IS IN THE VERTICAL POSITION SUSPENDED BY THE SHAFT. SHAFT END PLAY SHALL BE BETWEEN .0005 AND .0020 UNDER A 16 ± 1 OUNCE REVERSING GAUGE LOAD. SHAFT RADIAL PLAY SHALL BE .0007 TIR MAXIMUM AT A POINT .125 MAXIMUM FROM THE CASE UNDER AN 8.0 ± 0.5 OUNCE REVERSING GAUGE LOAD APPLIED TO A POINT .250 MAXIMUM FROM THE CASE.
     - (3) ROTOR INERTIA: THE ROTOR INERTIA SHALL BE 5.5 gm-cm^2 ± 20%.
     - (4) GEAR DESIGN DATA:

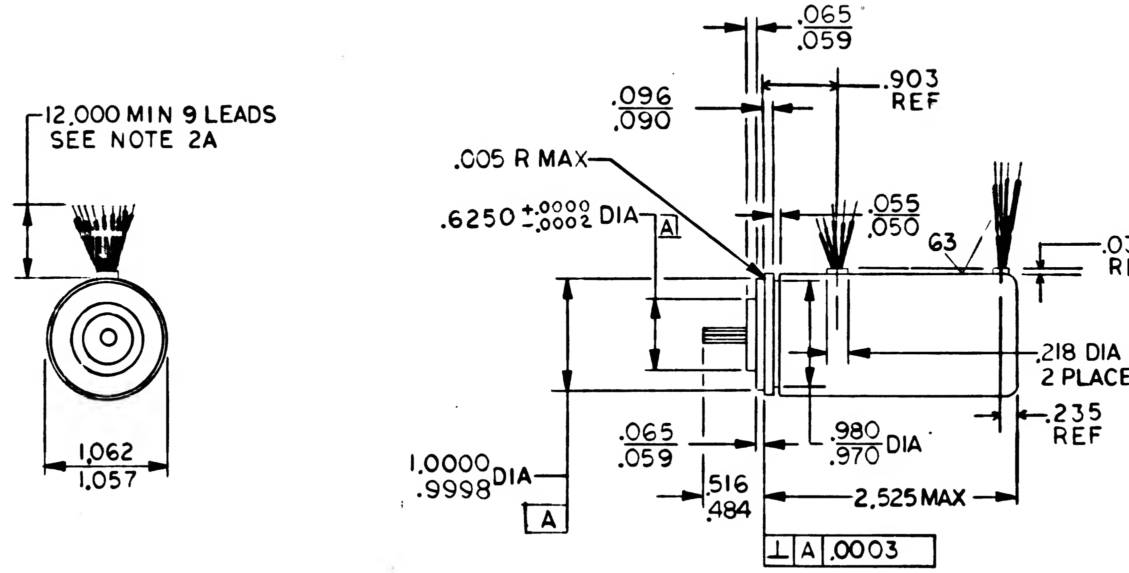
NUMBER OF TEETH	13
DIAMETRAL PITCH	120
PRESSURE ANGLE	20°
STANDARD PITCH DIAMETER	.1083
AGMA QUALITY CLASS	PREC. 1
OUTSIDE DIAMETER	$.1247 \begin{smallmatrix}+.0000\\-.0010\end{smallmatrix}$
GEAR TEETH FINISH	32

   - B. ELECTRICAL TESTS:
     - (1) UNITS SHALL MEET THE REQUIREMENTS OF ND 1002195.
3. DESIGN REQUIREMENTS:
   - A. OPERATING LIFE: 2000 HRS PER ND 1002016.
   - B. STORAGE LIFE: 5 YEARS WITH NO DETERIORATION OF THE INSULATION OR LUBRICANT.
   - C. CONSTRUCTION:
     - (1) MATERIAL: CASE AND SHAFT SHALL BE CORROSION-RESISTING STEEL IN ACCORDANCE WITH QQ-S-763, CLASS 416, COND T.
     - (2) FINISH: PASSIVATED IN ACCORDANCE WITH MIL-F-14072, E 300.
     - (3) LUBRICATION: BEARINGS SHALL BE LUBRICATED WITH LUBRICANT SPECIFIED IN ND 1002077, OR GE F-50 SILICONE OIL OR EQUIVALENT.
   - D. ENVIRONMENTAL:
     - (1) REQUIREMENTS ABOVE AT 25°C AMBIENT TEMPERATURE.
     - (2) GENERATOR OUTPUT WINDING SHALL NOT EXCEED +165°C AS MEASURED PER ND 1002016.
4. SPECIAL REQUIREMENTS: SUPPLIERS FINAL INSPECTION DETAIL PERFORMANCE DATA SHALL BE SUPPLIED WITH THE PRODUCT.

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.



WIRING DIAGRAM



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 17 June 63
CHECKED A Marty 6-18-63
APPROVAL R.J. Thurston 6-18-63
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL W Ruffin 17 June 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SERVO MOTOR-
TACHOMETER, GENERATOR
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1C10610
SCALE NONE WT .438 LBS MAX SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

0190101

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010613 A

REVISIONS 01792			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02475	Aug 63	WK

REQUIREMENTS:

1. GENERAL:

   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

   B. CONNECTORS SHALL BE CAPABLE OF MEETING THE APPLICABLE REQUIREMENTS OF MIL-C-21617 IN ADDITION TO THE REQUIREMENTS SPECIFIED BELOW.

   C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED ON ND 1002052, UNLESS MODIFIED OR AMMENDED BY THE DESIGN REQUIREMENTS SECTION (3) OF THIS DRAWING.

   D. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.

2. INSPECTION AND ACCEPTANCE:

   A. MECHANICAL REQUIREMENTS

      (1) DIMENSIONAL AND MECHANICAL PARAMETERS: ALL DIMENSIONS SHALL CONFORM TO APPLICABLE DRAWINGS.

      (2) 100% INSPECTION: INSPECT OPTICALLY FOR EVIDENCE OF CRACKS, BURRS, VOIDS, FLAWS OR ANY FOREIGN MATTER DETRIMENTAL TO THE FUNCTION OF THE CONNECTOR. CONTACT MATING SURFACES SHALL BE FREE FROM CRACKS, BURRS, BENDS AND FOREIGN PARTICLES.

      (3) LEAD MATERIAL:

         (a) THE LEAD MATERIAL FOR THE PLUG SHALL BE #26 TEFLON LEADS PER MIL-W-16878, TYPE ET, COLOR CODED.

      (4) MARKING: MARK EACH UNIT PER MIL-STD-130 WITH MANUFACTURERS SYMBOL, DATE OR LOT CODE, THE NASA DRAWING NUMBER AND REVISION LETTER. UNITS SHALL BE INDIVIDUALLY PACKED IN SEALED POLYETHYLENE FOR SHIPMENT IN ACCORDANCE WITH MIL-E-17555, LEVEL B AND CONTAINERS MARKED WITH THE MANUFACTURERS NAME, NASA DRAWING NUMBER AND REVISION LETTER.

   B. ELECTRICAL REQUIREMENTS

      (1) INSULATION RESISTANCE: 1,000 MEGOHMS MINIMUM AT 500 VOLTS DC PER METHOD 302 OF MIL-STD-202.

      (2) DIELECTRIC STRENGTH, SEA LEVEL: 900 VOLTS RMS, PER METHOD 301 OF MIL-STD-202.

3. DESIGN REQUIREMENTS:

   A. ELECTRICAL

      (1) CURRENT RATING: THE CONTACTS SHALL BE RATED AT 3.0 AMPS MAX.

      (2) WORKING VOLTAGE: 250 VOLTS D.C.

      (3) FLASHOVER VOLTAGE: RATED AT 1200 V.A.C. R.M.S.

      (4) DIELECTRIC WITHSTANDING VOLTAGE: PER METHOD 301 OF MIL-STD-202 (100,000 FT: 500 VOLTS RMS)

      (5) CONTACT RESISTANCE: WHEN MATED IN PAIRS THE CONTACT RESISTANCE AT 100MADC SHALL NOT EXCEED .01 OHMS MAX, PER MIL-STD-202 METHOD 307.

-1	PLUG	MALE CONTACTS

A	A	—
SHEET 1	SHEET 2	SHEET 3
REVISION STATUS OF SHEETS		

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Bob Kong DATE 10 June 63
CHECKED George Kress 25 June 63
APPROVAL S. Smith/RT.
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL D Hazel 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
MICRO-D (9 PIN)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1010613
SCALE NONE | WT | SHEET 1 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 01792

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02475	7Aug63	WK

DESIGN REQUIREMENTS: (CONTINUED)

B. MECHANICAL

(1) OPERATING TEMPERATURE RANGE: -62°C TO +150°C

(2) INSULATING MATERIAL: DIALLYL PHTHALATE, GLASS FILLED PER MIL-M-14 TYPE SDG.

(3) INSERTION AND WITHDRAWAL: (WITH MATING CONNECTOR) INDIVIDUAL CONTACTS SHALL HAVE A MAXIMUM ENGAGEMENT FORCE OF 6 OUNCES AND A MINIMUM WITHDRAWAL FORCE OF .5 OUNCES. ASSEMBLIES SHALL NOT EXCEED A MATING FORCE EQUAL TO THE PRODUCT OF THE NUMBER OF CONTACTS X 7.5 OUNCES OR A WITHDRAWAL FORCE EQUAL TO THE PRODUCT OF THE NUMBER OF CONTACTS X 1 OUNCE.

(4) MATED CONNECTORS SHALL MEET THE VIBRATION REQUIREMENTS SPECIFIED IN ND 1002052 WITH THE ADDITIONAL REQUIREMENT THAT ANY DISCONTINUITY SHALL NOT EXCEED .05 MICROSECONDS MAX.

4. SPECIAL REQUIREMENTS:

A. CONTACT SEPARATION: (100% INSPECTION) ALL PIN CONTACTS SHALL BE TESTED WITH A STEEL TEST SLEEVE HAVING AN INSIDE DIAMETER OF $.0235\,^{+.0000}_{-.0001}$ AND FINISH OF 16 MICRO-INCHES MAX. THE TOTAL WEIGHT OF THE TEST SLEEVE SHALL BE .5 OUNCES $^{+.1}_{-.0}$. WHEN THE ASSEMBLY IS INVERTED THE PIN CONTACT SHALL RETAIN THE .5 OUNCE WEIGHT. THIS TEST SHALL BE PERFORMED ON THE CONTACTS PRIOR TO ASSEMBLY WITH THE CONNECTOR BODY.

B. THE FOLLOWING REQUIREMENTS SHALL BE SUBJECTED TO LOT SAMPLE TESTS PRIOR TO SHIPMENT, AS NOTED.

(1) TENSILE STRENGTH:

THE CRIMPED ASSEMBLIES FROM EACH TOOL SHALL BE SAMPLED PER MIL-STD-105 INSPECTION LEVEL II, AQL .65. THE ASSEMBLIES SHALL BE TESTED ON A HUNTER SCALE FOR TENSILE STRENGTH AND THE READINGS SHALL BE RECORDED. ALL AVERAGES AND RANGES SHALL BE WITHIN THE CONTROL LIMITS STATED BELOW OR THE LOT SHALL BE REJECTED. ASSEMBLIES SHALL BE PACKAGED AND IDENTIFIED WITH THE LOT NUMBER, WHICH SHALL ACCOMPANY THE UNITS TO FINAL INSPECTION, AND BE INCLUDED WITH THE CONNECTOR SHIPMENT. THIS APPLIES TO BOTH PINS AND SOCKETS.

THERE SHALL BE TWO DATA SHEETS FOR THE CRIMPING OF THE PINS, ONE FOR THE PIN AND ONE DATA SHEET FOR THE WIRE END.

	PIN		SOCKET
WIRE SIZE	CONTACT END	WIRE END	WIRE END
#26	3.0 lbs.	5.0 lbs.	5.0 lbs.

C. CLEANING: (100% INSPECTION) EACH CONNECTOR SHALL BE MATED THREE TIMES AND THEN ULTRASONICALLY CLEANED FOR 1/2 MINUTE BEFORE PACKAGING AND SHIPPING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN Bob Kane DATE 10 June 63
CHECKED Geo Price 25 Jun 63
APPROVAL S. Smith/NT
APPROVAL
NASA APPROVAL
MIT APPROVAL D. Hoag 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
MICRO—D (9 PIN)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010613

SCALE NONE WT SHEET 2 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

B	1010613

REVISIONS 01792

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02475	Aug63	WK
B	REVISED PER TDRR 12798	6/25/64	WK

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

B. CONNECTORS SHALL BE CAPABLE OF MEETING THE APPLICABLE REQUIREMENTS OF MIL-C-8384 IN ADDITION TO THE REQUIREMENTS SPECIFIED BELOW.

C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED ON ND 1002052, UNLESS MODIFIED OR AMMENDED BY THE DESIGN REQUIREMENTS SECTION (3) OF THIS DRAWING.

D. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.

2. INSPECTION AND ACCEPTANCE:

A. MECHANICAL REQUIREMENTS

(1) DIMENSIONAL AND MECHANICAL PARAMETERS: ALL DIMENSIONS SHALL CONFORM TO APPLICABLE DRAWINGS.

(2) 100% INSPECTION: INSPECT OPTICALLY FOR EVIDENCE OF CRACKS, BURRS, VOIDS, FLAWS OR ANY FOREIGN MATTER DETRIMENTAL TO THE FUNCTION OF THE CONNECTOR. CONTACT MATING SURFACES SHALL BE FREE FROM CRACKS, BURRS, BENDS AND FOREIGN PARTICLES.

(3) LEAD MATERIAL:

(a) THE LEAD MATERIAL FOR THE PLUG SHALL BE #26 TEFLON LEADS PER MIL-W-16878, TYPE ET, COLOR CODED.

(4) MARKING: MARK EACH UNIT PER ND 1002019 WITH MANUFACTURERS SYMBOL, DATE OR LOT CODE, THE NASA DRAWING NUMBER AND REVISION LETTER. UNITS SHALL BE INDIVIDUALLY PACKED IN SEALED POLYETHYLENE FOR SHIPMENT IN ACCORDANCE WITH ND1002215 CLASS I AND CONTAINERS MARKED WITH THE MANUFACTURERS NAME, NASA DRAWING NUMBER AND REVISION LETTER.

B. ELECTRICAL REQUIREMENTS

(1) INSULATION RESISTANCE: 1,000 MEGOHMS MINIMUM AT 500 VOLTS DC PER METHOD 302 OF MIL-STD-202.

(2) DIELECTRIC STRENGTH, SEA LEVEL: 900 VOLTS RMS, PER METHOD 301 OF MIL-STD-202.

3. DESIGN REQUIREMENTS:

A. ELECTRICAL

(1) CURRENT RATING: THE CONTACTS SHALL BE RATED AT 3.0 AMPS MAX.

(2) WORKING VOLTAGE: 250 VOLTS D.C.

(3) FLASHOVER VOLTAGE: RATED AT 900 V.A.C. R.M.S.TEST VOLTAGE

(4) DIELECTRIC WITHSTANDING VOLTAGE: PER METHOD 301 OF MIL-STD-202 (100,000 FT: 250 VOLTS AC RMS

(5) CONTACT RESISTANCE: WHEN MATED IN PAIRS THE CONTACT RESISTANCE AT 100MADC SHALL NOT EXCEED .01 OHMS MAX, PER MIL-STD-202 METHOD 307.

-1	PLUG	MALE CONTACTS

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Bob Kane DATE 10 June 63
CHECKED George Kriz 25 June 63
APPROVAL S. Smith/DT.
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL D. Hazel 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
MICRO-D (9 PIN)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010613
SCALE NONE
WT
SHEET 1 OF 3

1010613 B

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 01792

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02475	7 Aug 63	WK
B	REVISED PER TDRR 12798	4/28/64	WK

DESIGN REQUIREMENTS: (CONTINUED)

B. MECHANICAL

(1) OPERATING TEMPERATURE RANGE: -62°C TO +150°C

(2) INSULATING MATERIAL: DIALLYL PHTHALATE, GLASS FILLED PER MIL-M-19833 TYPE GD1-30.

(3) INSERTION AND WITHDRAWAL: (WITH MATING CONNECTOR) INDIVIDUAL CONTACTS SHALL HAVE A MAXIMUM ENGAGEMENT FORCE OF 6 OUNCES AND A MINIMUM WITHDRAWAL FORCE OF .5 OUNCES. ASSEMBLIES SHALL NOT EXCEED A MATING FORCE EQUAL TO THE PRODUCT OF THE NUMBER OF CONTACTS X 7.5 OUNCES OR A WITHDRAWAL FORCE EQUAL TO THE PRODUCT OF THE NUMBER OF CONTACTS X 1 OUNCE INITIALLY - 9.5 OUNCE AFTER CONTACT LIFE.

(4) MATED CONNECTORS SHALL MEET THE VIBRATION REQUIREMENTS SPECIFIED IN ND 1002052 WITH THE ADDITIONAL REQUIREMENT THAT ANY DISCONTINUITY SHALL NOT EXCEED .05 MICROSECONDS MAX.

4. SPECIAL REQUIREMENTS:

A. CONTACT SEPARATION: (100% INSPECTION) ALL PIN CONTACTS SHALL BE TESTED WITH A STEEL TEST SLEEVE HAVING AN INSIDE DIAMETER OF .0235 $^{+.0000}_{-.0001}$ AND FINISH OF 16 MICRO-INCHES MAX. THE TOTAL WEIGHT OF THE TEST SLEEVE SHALL BE .5 OUNCES $^{+.1}_{-.0}$. WHEN THE ASSEMBLY IS INVERTED THE PIN CONTACT SHALL RETAIN THE .5 OUNCE WEIGHT. THIS TEST SHALL BE PERFORMED ON THE CONTACTS PRIOR TO ASSEMBLY WITH THE CONNECTOR BODY.

B. THE FOLLOWING REQUIREMENTS SHALL BE SUBJECTED TO LOT SAMPLE TESTS PRIOR TO SHIPMENT, AS NOTED.

(1) TENSILE STRENGTH:

THE CRIMPED ASSEMBLIES FROM EACH TOOL SHALL BE SAMPLED PER MIL-STD-105 INSPECTION LEVEL II, AQL .65. THE ASSEMBLIES SHALL BE TESTED ON A HUNTER SCALE FOR TENSILE STRENGTH AND THE READINGS SHALL BE RECORDED. ALL AVERAGES AND RANGES SHALL BE WITHIN THE CONTROL LIMITS STATED BELOW OR THE LOT SHALL BE REJECTED. ASSEMBLIES SHALL BE PACKAGED AND IDENTIFIED WITH THE LOT NUMBER, WHICH SHALL ACCOMPANY THE UNITS TO FINAL INSPECTION, AND BE INCLUDED WITH THE CONNECTOR SHIPMENT. THIS APPLIES TO BOTH PINS AND SOCKETS. THERE SHALL BE TWO DATA SHEETS FOR THE CRIMPING OF THE PINS, ONE FOR THE PIN AND ONE DATA SHEET FOR THE WIRE END.

	PIN		SOCKET
WIRE SIZE	CONTACT END	WIRE END	WIRE END
#26	3.0 lbs.	5.0 lbs.	5.0 lbs.

(2) SOCKET STRENGTH: SIDE LOAD (IN CONNECTOR): 18 OUNCES MINIMUM SHALL BE APPLIED AT THE PIN ENGAGING END OF THE SOCKET. INTERMATABILITY AND PERFORMANCE SHALL NOT BE IMPAIRED.

C. CLEANING: (100% INSPECTION) EACH CONNECTOR SHALL BE MATED THREE TIMES AND THEN ULTRASONICALLY CLEANED FOR 1/2 MINUTE BEFORE PACKAGING AND SHIPPING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Bob Kane DATE 10 June 63
CHECKED Geo Price 15 Jun 63
APPROVAL S. Smith
APPROVAL
NASA APPROVAL
MIT APPROVAL 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
MICRO-D (9 PIN)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010613
SCALE NONE WT SHEET 2 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

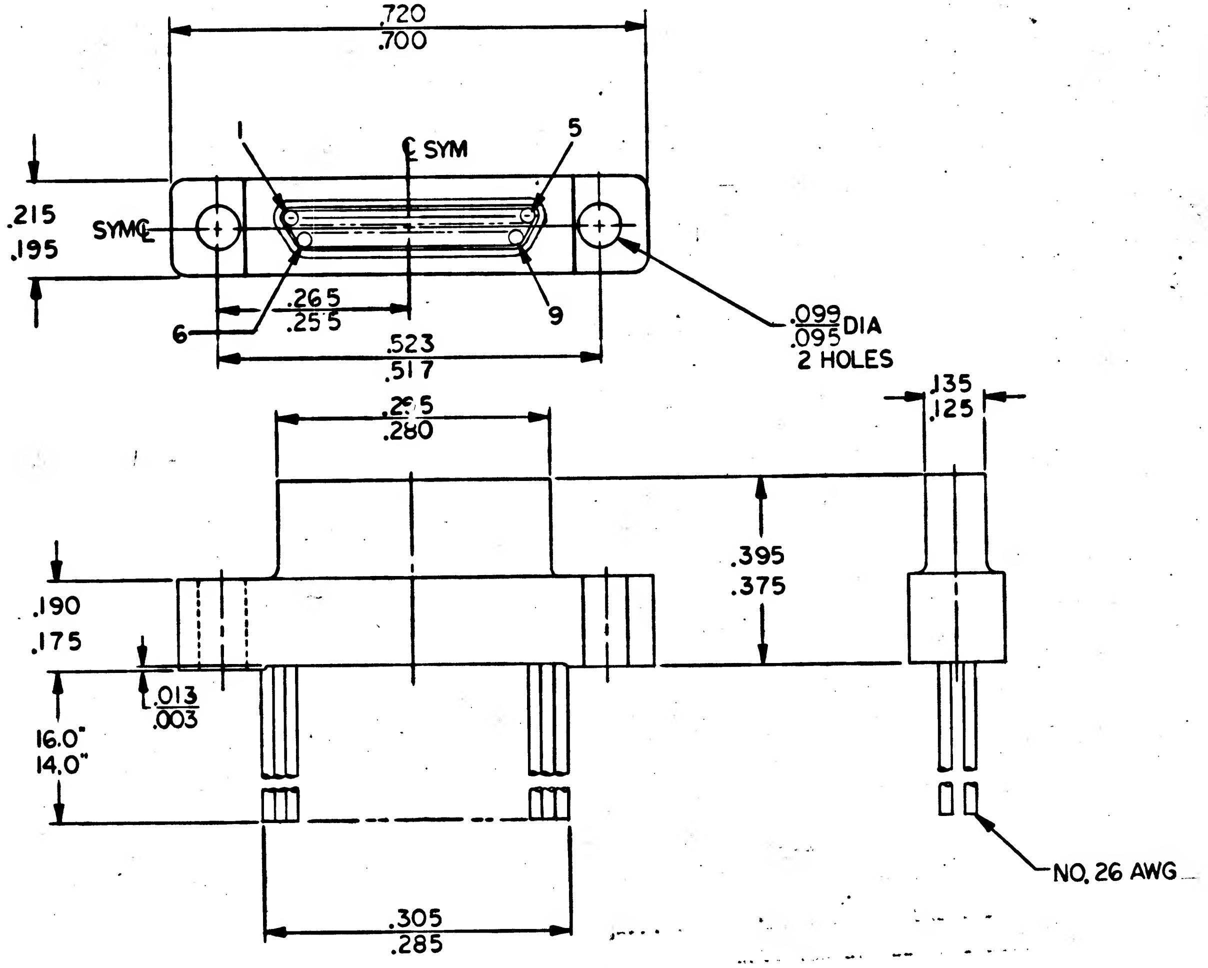
B 1010613 Ⓜ

REVISIONS 01792

SYM	DESCRIPTION	DATE	APPROVAL
B	REVISED PER TDRR 12798	9/14/64	wl

COLOR CODE TABLE

PIN NO.	COLOR CODING	WIRE NO.
1	BLK	26AWG
2	BRN	
3	RED	
4	ORN	
5	YEL	
6	GRN	
7	BLU	
8	VIO	
9	GREY	26AWG



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN Bob Kane DATE 10 June 63
CHECKED Geo. J. Price 25 June 63
APPROVAL S. Smith /BT.
APPROVAL
NASA APPROVAL
MIT APPROVAL R. Hazel 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
MICRO-D (9 PIN)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010613
SCALE NONE WT SHEET 3 OF 3

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER: AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 01792

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02475	Aug 63	WK
B	REVISED PER TDRR 12798	6/15/64	WK
C	REVISED PER TDRR 17602	23 Mar 65	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. CONNECTORS SHALL BE CAPABLE OF MEETING THE APPLICABLE REQUIREMENTS OF MIL-C-8384 IN ADDITION TO THE REQUIREMENTS SPECIFIED BELOW.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED ON ND 1002052, UNLESS MODIFIED OR AMMENDED BY THE DESIGN REQUIREMENTS SECTION (3) OF THIS DRAWING.
   - D. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS
     - (1) DIMENSIONAL AND MECHANICAL PARAMETERS: ALL DIMENSIONS SHALL CONFORM TO APPLICABLE DRAWINGS.
     - (2) 100% INSPECTION: INSPECT OPTICALLY FOR EVIDENCE OF CRACKS, BURRS, VOIDS, FLAWS OR ANY FOREIGN MATTER DETRIMENTAL TO THE FUNCTION OF THE CONNECTOR. CONTACT MATING SURFACES SHALL BE FREE FROM CRACKS, BURRS, BENDS AND FOREIGN PARTICLES.
     - (3) LEAD MATERIAL:
       - (a) THE LEAD MATERIAL FOR THE PLUG SHALL BE #26 TEFLON LEADS PER MIL-W-16878, TYPE ET, COLOR CODED.
     - (4) MARKING: MARK EACH UNIT PER ND 1002019 WITH MANUFACTURERS SYMBOL, DATE OR LOT CODE, THE NASA DRAWING NUMBER AND REVISION LETTER. UNITS SHALL BE INDIVIDUALLY PACKED IN SEALED POLYETHYLENE FOR SHIPMENT IN ACCORDANCE WITH ND1002215 CLASS I AND CONTAINERS MARKED WITH THE MANUFACTURERS NAME, NASA DRAWING NUMBER AND REVISION LETTER.
   - B. ELECTRICAL REQUIREMENTS
     - (1) INSULATION RESISTANCE: 1,000 MEGOHMS MINIMUM AT 500 VOLTS DC PER METHOD 302 OF MIL-STD-202.
     - (2) DIELECTRIC STRENGTH, SEA LEVEL: 900 VOLTS RMS, PER METHOD 301 OF MIL-STD-202.
3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL
     - (1) CURRENT RATING: THE CONTACTS SHALL BE RATED AT 3.0 AMPS MAX.
     - (2) WORKING VOLTAGE: 250 VOLTS D.C.
     - (3) FLASHOVER VOLTAGE: RATED AT 900 V.A.C. R.M.S. TEST VOLTAGE
     - (4) DIELECTRIC WITHSTANDING VOLTAGE: PER METHOD 301 OF MIL-STD-202 (100,000 FT: 250 VOLTS AC RMS
     - (5) CONTACT RESISTANCE: WHEN MATED IN PAIRS THE CONTACT RESISTANCE AT 100MADC SHALL NOT EXCEED .01 OHMS MAX, PER MIL-STD-202 METHOD 307.

-1	PLUG	MALE CONTACTS

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Bob Kane DATE 10 June 63
CHECKED George H Price 25 June 63
APPROVAL S. Smith/DT.
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL D Hazel 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
MICRO-D (9 PIN)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010613
SCALE NONE
WT
SHEET 1 OF 3

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010613 C

REVISIONS 01792			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02475	7 Aug 63	WK
B	REVISED PER TDRR 12798	9/28/64	WK
C	REVISED PER TDRR 17602	23 Feb 65	WK

DESIGN REQUIREMENTS: (CONTINUED)

B. MECHANICAL

(1) OPERATING TEMPERATURE RANGE: -62°C TO +150°C

(2) INSULATING MATERIAL: DIALLYL PHTHALATE, GLASS FILLED PER MIL-M-14,TYPE SDG

(3) INSERTION AND WITHDRAWAL: (WITH MATING CONNECTOR) INDIVIDUAL CONTACTS SHALL HAVE A MAXIMUM ENGAGEMENT FORCE OF 6 OUNCES AND A MINIMUM WITHDRAWAL FORCE OF .5 OUNCES. ASSEMBLIES SHALL NOT EXCEED A MATING FORCE EQUAL TO THE PRODUCT OF THE NUMBER OF CONTACTS X 7.5 OUNCES OR A WITHDRAWAL FORCE EQUAL TO THE PRODUCT OF THE NUMBER OF CONTACTS X 1 OUNCE INITIALLY - 9.5 OUNCE AFTER CONTACT LIFE.

(4) MATED CONNECTORS SHALL MEET THE VIBRATION REQUIREMENTS SPECIFIED IN ND 1002052 WITH THE ADDITIONAL REQUIREMENT THAT ANY DISCONTINUITY SHALL NOT EXCEED .05 MICROSECONDS MAX.

4. SPECIAL REQUIREMENTS:

A. CONTACT SEPARATION: (100% INSPECTION) ALL PIN CONTACTS SHALL BE TESTED WITH A STEEL TEST SLEEVE HAVING AN INSIDE DIAMETER OF $.0235 ^{+.0000}_{-.0001}$ AND FINISH OF 16 MICRO-INCHES MAX. THE TOTAL WEIGHT OF THE TEST SLEEVE SHALL BE .5 OUNCES $^{+.1}_{-.0}$. WHEN THE ASSEMBLY IS INVERTED THE PIN CONTACT SHALL RETAIN THE .5 OUNCE WEIGHT. THIS TEST SHALL BE PERFORMED ON THE CONTACTS PRIOR TO ASSEMBLY WITH THE CONNECTOR BODY.

B. THE FOLLOWING REQUIREMENTS SHALL BE SUBJECTED TO LOT SAMPLE TESTS PRIOR TO SHIPMENT, AS NOTED.

(1) TENSILE STRENGTH:

THE CRIMPED ASSEMBLIES FROM EACH TOOL SHALL BE SAMPLED PER MIL-STD-105 INSPECTION LEVEL II, AQL .65 . THE ASSEMBLIES SHALL BE TESTED ON A HUNTER SCALE FOR TENSILE STRENGTH AND THE READINGS SHALL BE RECORDED. ALL AVERAGES AND RANGES SHALL BE WITHIN THE CONTROL LIMITS STATED BELOW OR THE LOT SHALL BE REJECTED. ASSEMBLIES SHALL BE PACKAGED AND IDENTIFIED WITH THE LOT NUMBER, WHICH SHALL ACCOMPANY THE UNITS TO FINAL INSPECTION, AND BE INCLUDED WITH THE CONNECTOR SHIPMENT. THIS APPLIES TO BOTH PINS AND SOCKETS.
THERE SHALL BE TWO DATA SHEETS FOR THE CRIMPING OF THE PINS, ONE FOR THE PIN AND ONE DATA SHEET FOR THE WIRE END.

	PIN		SOCKET
WIRE SIZE	CONTACT END	WIRE END	WIRE END
#26	3.0 lbs.	5.0 lbs.	5.0 lbs.

(2) SOCKET STRENGTH: SIDE LOAD (IN CONNECTOR): 18 OUNCES MINIMUM SHALL BE APPLIED AT THE PIN ENGAGING END OF THE SOCKET. INTERMATABILITY AND PERFORMANCE SHALL NOT BE IMPAIRED.

C. CLEANING: (100% INSPECTION) EACH CONNECTOR SHALL BE MATED THREE TIMES AND THEN ULTRASONICALLY CLEANED FOR 1/2 MINUTE BEFORE PACKAGING AND SHIPPING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Bob Kane DATE 12 June 63
CHECKED [illegible] 15 Jun 63
APPROVAL S. Smith
APPROVAL
NASA APPROVAL
MIT APPROVAL 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
MICRO—D (9 PIN)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010613
SCALE NONE WT SHEET 2 OF 3

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

C 1010613

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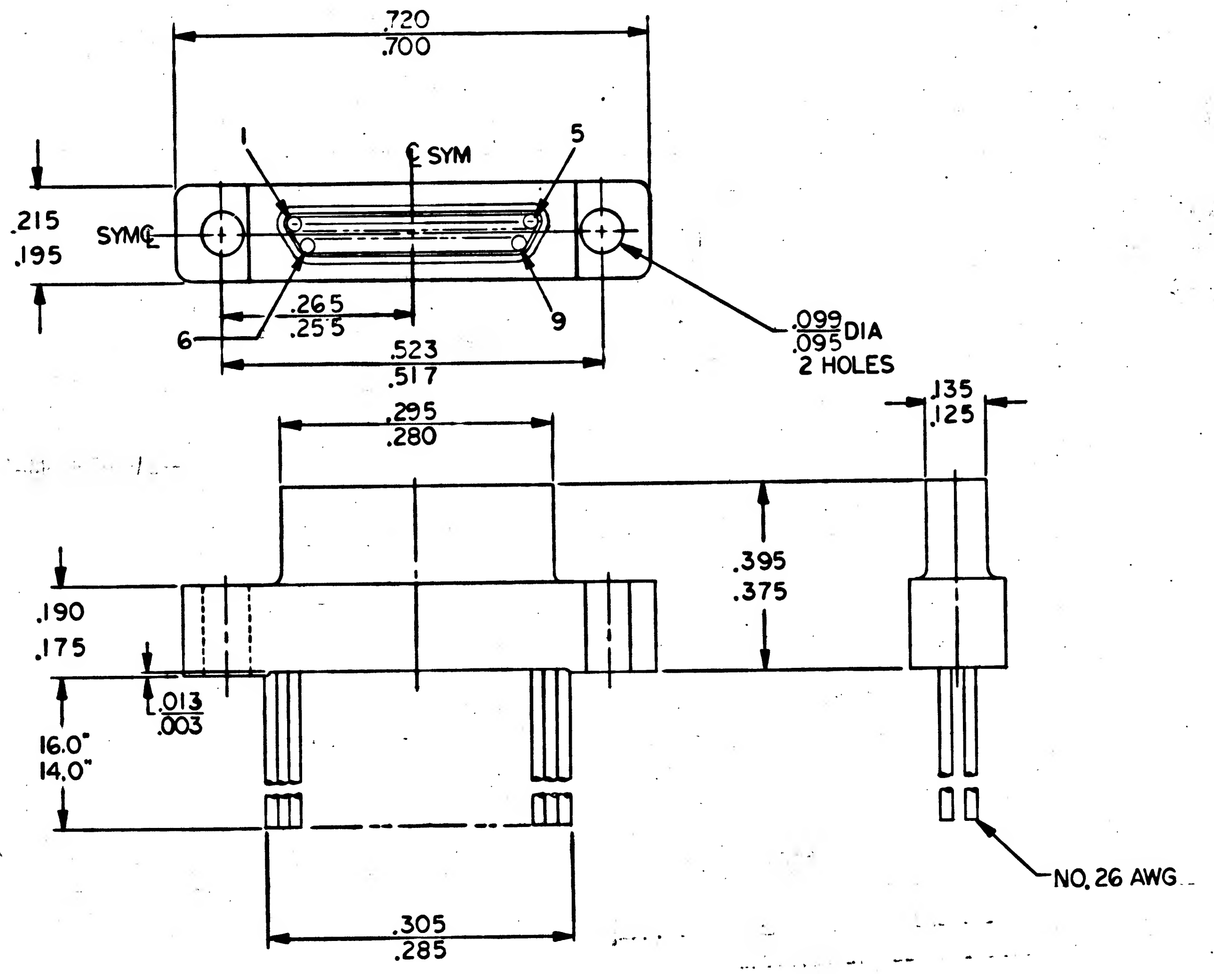
REVISIONS 01792

SYM	DESCRIPTION	DATE	APPROVAL
B	REVISED PER TDRR 12798	9/1/64	WR
C	REVISED PER TDRR 17602	23/1/66	WR

COLOR CODE TABLE

PIN NO.	COLOR CODING	WIRE NO.
1	BLK	26AWG
2	BRN	↑
3	RED	
4	ORN	
5	YEL	
6	GRN	
7	BLU	
8	VIO	↓
9	GREY	26AWG



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN Bob Kane DATE 10 June 63
CHECKED Geo J Price 25 June 63
APPROVAL S. Smith /AT.
APPROVAL
NASA APPROVAL
MIT APPROVAL D Hoag 6/26/6

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
MICRO-D (9 PIN)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010613
SCALE NONE
WT
SHEET 3 OF 3

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010613

REVISIONS 01792			
SYM	DESCRIPTION	DATE	APPROVAL

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

B. CONNECTORS SHALL BE CAPABLE OF MEETING THE APPLICABLE REQUIREMENTS OF MIL-C-21617 IN ADDITION TO THE REQUIREMENTS SPECIFIED BELOW.

C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED ON ND 1002052, UNLESS MODIFIED OR AMMENDED BY THE DESIGN REQUIREMENTS SECTION (3) OF THIS DRAWING.

D. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.

2. INSPECTION AND ACCEPTANCE:

A. MECHANICAL REQUIREMENTS

(1) DIMENSIONAL AND MECHANICAL PARAMETERS: ALL DIMENSIONS SHALL CONFORM TO APPLICABLE DRAWINGS.

(2) 100% INSPECTION: INSPECT OPTICALLY FOR EVIDENCE OF CRACKS, BURRS, VOIDS, FLAWS OR ANY FOREIGN MATTER DETRIMENTAL TO THE FUNCTION OF THE CONNECTOR. CONTACT MATING SURFACES SHALL BE FREE FROM CRACKS, BURRS, BENDS AND FOREIGN PARTICLES.

(3) LEAD MATERIAL:

(a) THE LEAD MATERIAL FOR THE PLUG SHALL BE #26 TEFLON LEADS PER MIL-W-16878, TYPE ET, COLOR CODED.

(4) MARKING: MARK EACH UNIT PER MIL-STD-130 WITH MANUFACTURERS SYMBOL, DATE OR LOT CODE, THE NASA DRAWING NUMBER AND REVISION LETTER. UNITS SHALL BE INDIVIDUALLY PACKED IN SEALED POLYETHYLENE FOR SHIPMENT IN ACCORDANCE WITH MIL-E-17555, LEVEL B AND CONTAINERS MARKED WITH THE MANUFACTURERS NAME, NASA DRAWING NUMBER AND REVISION LETTER.

B. ELECTRICAL REQUIREMENTS

(1) INSULATION RESISTANCE: 1,000 MEGOHMS MINIMUM AT 500 VOLTS DC PER METHOD 302 OF MIL-STD-202.

(2) DIELECTRIC STRENGTH, SEA LEVEL: 900 VOLTS RMS, PER METHOD 301 OF MIL-STD-202.

3. DESIGN REQUIREMENTS:

A. ELECTRICAL

(1) CURRENT RATING: THE CONTACTS SHALL BE RATED AT 3.0 AMPS MAX.

(2) WORKING VOLTAGE: 250 VOLTS D.C.

(3) FLASHOVER VOLTAGE: RATED AT 1200 V.A.C. R.M.S.

(4) DIELECTRIC WITHSTANDING VOLTAGE: PER METHOD 301 OF MIL-STD-202 (100,000 FT: 500 VOLTS RMS)

(5) CONTACT RESISTANCE: WHEN MATED IN PAIRS THE CONTACT RESISTANCE AT 100MADC SHALL NOT EXCEED .01 OHMS MAX, PER MIL-STD-202 METHOD 307.

-1	PLUG	MALE CONTACTS

SHEET 1	SHEET 2	SHEET 3
REVISION STATUS OF SHEETS		

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Bob Kane DATE 10 June 63
CHECKED George [illegible] 25 June 63
APPROVAL S. Smith/DT.
APPROVAL
NASA APPROVAL Jack Barnes
MIT APPROVAL D Hazel 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
MICRO-D (9 PIN)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010613
SCALE NONE
WT
SHEET 1 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010613

REVISIONS 01792

SYM	DESCRIPTION	DATE	APPROVAL

DESIGN REQUIREMENTS: (CONTINUED)

B. MECHANICAL

(1) OPERATING TEMPERATURE RANGE: -62°C TO +150°C

(2) INSULATING MATERIAL: DIALLYL PHTHALATE, GLASS FILLED PER MIL-M-14 TYPE SDG.

(3) INSERTION AND WITHDRAWAL: (WITH MATING CONNECTOR) INDIVIDUAL CONTACTS SHALL HAVE A MAXIMUM ENGAGEMENT FORCE OF 6 OUNCES AND A MINIMUM WITHDRAWAL FORCE OF .5 OUNCES. ASSEMBLIES SHALL NOT EXCEED A MATING FORCE EQUAL TO THE PRODUCT OF THE NUMBER OF CONTACTS X 7.5 OUNCES OR A WITHDRAWAL FORCE EQUAL TO THE PRODUCT OF THE NUMBER OF CONTACTS X 1 OUNCE.

(4) MATED CONNECTORS SHALL MEET THE VIBRATION REQUIREMENTS SPECIFIED IN ND 1002052 WITH THE ADDITIONAL REQUIREMENT THAT ANY DISCONTINUITY SHALL NOT EXCEED .05 MICROSECONDS MAX.

4. SPECIAL REQUIREMENTS:

A. CONTACT SEPARATION: (100% INSPECTION) ALL PIN CONTACTS SHALL BE TESTED WITH A STEEL TEST SLEEVE HAVING AN INSIDE DIAMETER OF $.0235\,^{+.0000}_{-.0001}$ AND FINISH OF 16 MICRO-INCHES MAX. THE TOTAL WEIGHT OF THE TEST SLEEVE SHALL BE .5 OUNCES $^{+.1}_{-.0}$. WHEN THE ASSEMBLY IS INVERTED THE PIN CONTACT SHALL RETAIN THE .5 OUNCE WEIGHT. THIS TEST SHALL BE PERFORMED ON THE CONTACTS PRIOR TO ASSEMBLY WITH THE CONNECTOR BODY.

B. THE FOLLOWING REQUIREMENTS SHALL BE SUBJECTED TO LOT SAMPLE TESTS PRIOR TO SHIPMENT, AS NOTED.

(1) TENSILE STRENGTH:

THE CRIMPED ASSEMBLIES FROM EACH TOOL SHALL BE SAMPLED PER MIL-STD-105 INSPECTION LEVEL II, AQL .65 . THE ASSEMBLIES SHALL BE TESTED ON A HUNTER SCALE FOR TENSILE STRENGTH AND THE READINGS SHALL BE RECORDED. ALL AVERAGES AND RANGES SHALL BE WITHIN THE CONTROL LIMITS STATED BELOW OR THE LOT SHALL BE REJECTED. ASSEMBLIES SHALL BE PACKAGED AND IDENTIFIED WITH THE LOT NUMBER, WHICH SHALL ACCOMPANY THE UNITS TO FINAL INSPECTION, AND BE INCLUDED WITH THE CONNECTOR SHIPMENT. THIS APPLIES TO BOTH PINS AND SOCKETS.

THERE SHALL BE TWO DATA SHEETS FOR THE CRIMPING OF THE PINS, ONE FOR THE PIN AND ONE DATA SHEET FOR THE WIRE END.

	PIN		SOCKET
WIRE SIZE	CONTACT END	WIRE END	WIRE END
# 28	3.0 lbs.	5.0 lbs.	5.0 lbs.

C. CLEANING: (100% INSPECTION) EACH CONNECTOR SHALL BE MATED THREE TIMES AND THEN ULTRASONICALLY CLEANED FOR 1/2 MINUTE BEFORE PACKAGING AND SHIPPING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN Bob Kane DATE 10 June 63
CHECKED Geo Price 15 Jun 63
APPROVAL S. Smith/BT
APPROVAL
NASA APPROVAL Jack Barnes
MIT APPROVAL D. Hoag 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
MICRO-D (9 PIN)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010613
SCALE NONE
WT
SHEET 2 OF 3

1010613

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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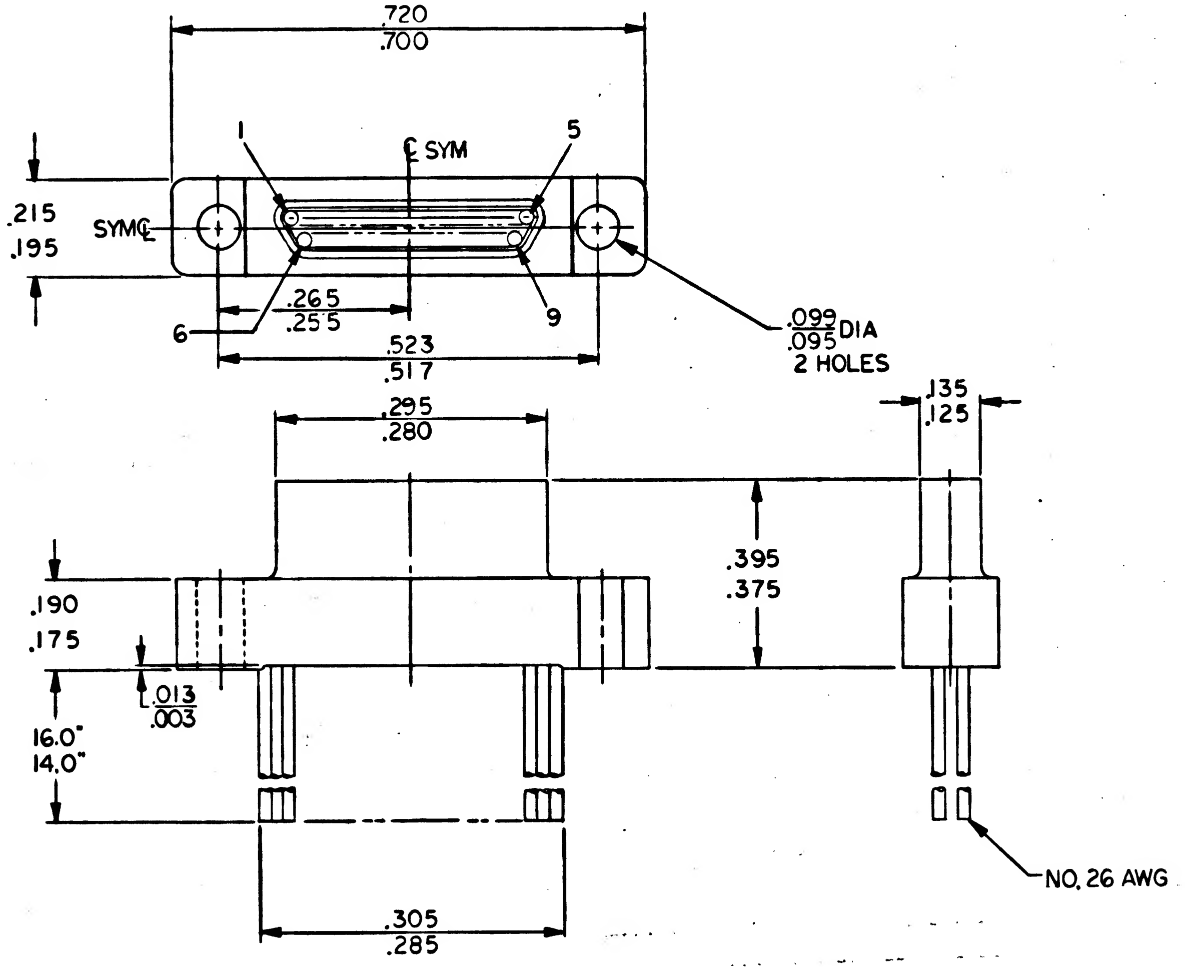
1010613

REVISIONS 01792

SYM	DESCRIPTION	DATE	APPROVAL

COLOR CODE TABLE

PIN NO.	COLOR CODING	WIRE NO.
1	BLK	26AWG
2	BRN	
3	RED	
4	ORN	
5	YEL	
6	GRN	
7	BLU	
8	VIO	
9	GREY	26AWG



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

HEAT TREATMENT

FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN Bob Kane DATE 10 June 63
CHECKED Geo J Price 25 June 63
APPROVAL S. Smith /BT.
APPROVAL

NASA APPROVAL

MIT APPROVAL 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL
MICRO-D (9 PIN)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1010613

SCALE NONE | WT | SHEET 3 OF 3

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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1010615 A

REVISIONS 01792

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02481	8-7-63	WK.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. CONNECTORS SHALL BE CAPABLE OF MEETING THE APPLICABLE REQUIREMENTS OF MIL-C-21617 IN ADDITION TO THE REQUIREMENTS SPECIFIED BELOW.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED ON ND 1002052, UNLESS MODIFIED OR AMMENDED BY THE DESIGN REQUIREMENTS SECTION (3) OF THIS DRAWING.
   - D. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS
     - (1) DIMENSIONAL AND MECHANICAL PARAMETERS: ALL DIMENSIONS SHALL CONFORM TO APPLICABLE DRAWINGS.
     - (2) 100% INSPECTION: INSPECT OPTICALLY FOR EVIDENCE OF CRACKS, BURRS, VOIDS, FLAWS OR ANY FOREIGN MATTER DETRIMENTAL TO THE FUNCTION OF THE CONNECTOR. CONTACT MATING SURFACES SHALL BE FREE FROM CRACKS, BURRS, BENDS AND FOREIGN PARTICLES.
     - (3) LEAD MATERIAL:
       - (a) THE WIRE LEADS ON THE REAR OF THE RECEPTACLE SHALL CONFORM TO THE REQUIREMENTS OF ND 1015401. A CERTIFICATE OF COMPLIANCE SHALL BE SUBMITTED WITH EACH SHIPMENT.
       - (b) THE LEAD MATERIAL FOR THE PLUG SHALL BE #26 TEFLON LEADS PER MIL-W-16878, TYPE ET, COLOR CODED.
     - (4) MARKING: MARK EACH UNIT PER MIL-STD-130 WITH MANUFACTURERS SYMBOL, DATE OR LOT CODE, THE NASA DRAWING NUMBER AND REVISION LETTER. UNITS SHALL BE INDIVIDUALLY PACKED IN SEALED POLYETHYLENE FOR SHIPMENT IN ACCORDANCE WITH MIL-E-17555, LEVEL B AND CONTAINERS MARKED WITH THE MANUFACTURERS NAME, NASA DRAWING NUMBER AND REVISION LETTER.
   - B. ELECTRICAL REQUIREMENTS
     - (1) INSULATION RESISTANCE: 1,000 MEGOHMS MINIMUM AT 500 VOLTS DC PER METHOD 302 OF MIL-STD-202.
     - (2) DIELECTRIC STRENGTH, SEA LEVEL: 900 VOLTS RMS, PER METHOD 301 OF MIL-STD-202.
3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL
     - (1) CURRENT RATING: THE CONTACTS SHALL BE RATED AT 3.0 AMPS MAX.
     - (2) WORKING VOLTAGE: 250 VOLTS D.C.
     - (3) FLASHOVER VOLTAGE: RATED AT 1200 V.A.C. R.M.S.
     - (4) DIELECTRIC WITHSTANDING VOLTAGE: PER METHOD 301 OF MIL-STD-202 (100,000 FT: 500 VOLTS RMS)
     - (5) CONTACT RESISTANCE: WHEN MATED IN PAIRS THE CONTACT RESISTANCE AT 100MADC SHALL NOT EXCEED .01 OHMS MAX, PER MIL-STD-202 METHOD 307.

-1	PLUG	MALE CONTACTS
-2	RECEPTACLE	FEMALE CONTACTS

A	A	—	—
SHEET 1	SHEET 2	SHEET 3	SHEET 4
REVISION STATUS OF SHEETS			

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 14 June 63
CHECKED Geo Prod 25 June 63
APPROVAL S. Smith/B.T.
APPROVAL
NASA APPROVAL
MIT APPROVAL L. Hafeld 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, ELECTRICAL
51 CONTACTS, PLUG & RECEPTACLE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010615
SCALE NONE
WT
SHEET 1 OF 4

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 01792

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02481	8-7-63	wk

DESIGN REQUIREMENTS: (CONTINUED)

B. MECHANICAL

(1) OPERATING TEMPERATURE RANGE: -62°C TO +150°C

(2) INSULATING MATERIAL: DIALLYL PHTHALATE, GLASS FILLED PER MIL-M-14 TYPE SDG.

(3) INSERTION AND WITHDRAWAL: (WITH MATING CONNECTOR) INDIVIDUAL CONTACTS SHALL HAVE A MAXIMUM ENGAGEMENT FORCE OF 6 OUNCES AND A MINIMUM WITHDRAWAL FORCE OF .5 OUNCES. ASSEMBLIES SHALL NOT EXCEED A MATING FORCE EQUAL TO THE PRODUCT OF THE NUMBER OF CONTACTS X 7.5 OUNCES OR A WITHDRAWAL FORCE EQUAL TO THE PRODUCT OF THE NUMBER OF CONTACTS X 1 OUNCE.

(4) MATED CONNECTORS SHALL MEET THE VIBRATION REQUIREMENTS SPECIFIED IN ND 1002052 WITH THE ADDITIONAL REQUIREMENT THAT ANY DISCONTINUITY SHALL NOT EXCEED .05 MICROSECONDS MAX.

4. SPECIAL REQUIREMENTS:

A. CONTACT SEPARATION: (100% INSPECTION) ALL PIN CONTACTS SHALL BE TESTED WITH A STEEL TEST SLEEVE HAVING AN INSIDE DIAMETER OF $.0235\,^{+.0000}_{-.0001}$ AND FINISH OF 16 MICRO-INCHES MAX. THE TOTAL WEIGHT OF THE TEST SLEEVE SHALL BE $.5$ OUNCES $^{+.1}_{-.0}$. WHEN THE ASSEMBLY IS INVERTED THE PIN CONTACT SHALL RETAIN THE .5 OUNCE WEIGHT. THIS TEST SHALL BE PERFORMED ON THE CONTACTS PRIOR TO ASSEMBLY WITH THE CONNECTOR BODY.

B. THE FOLLOWING REQUIREMENTS SHALL BE SUBJECTED TO LOT SAMPLE TESTS PRIOR TO SHIPMENT, AS NOTED.

(1) TENSILE STRENGTH:

THE CRIMPED ASSEMBLIES FROM EACH TOOL SHALL BE SAMPLED PER MIL-STD-105 INSPECTION LEVEL II, AQL .65 . THE ASSEMBLIES SHALL BE TESTED ON A HUNTER SCALE FOR TENSILE STRENGTH AND THE READINGS SHALL BE RECORDED. ALL AVERAGES AND RANGES SHALL BE WITHIN THE CONTROL LIMITS STATED BELOW OR THE LOT SHALL BE REJECTED. ASSEMBLIES SHALL BE PACKAGED AND IDENTIFIED WITH THE LOT NUMBER, WHICH SHALL ACCOMPANY THE UNITS TO FINAL INSPECTION, AND BE INCLUDED WITH THE CONNECTOR SHIPMENT. . THIS APPLIES TO BOTH PINS AND SOCKETS. THERE SHALL BE TWO DATA SHEETS FOR THE CRIMPING OF THE PINS, ONE FOR THE PIN AND ONE DATA SHEET FOR THE WIRE END.

	PIN		SOCKET
WIRE SIZE	CONTACT END	WIRE END	WIRE END
# 26	3.0 lbs.	5.0 lbs.	5.0 lbs.

C. CLEANING: (100% INSPECTION) EACH CONNECTOR SHALL BE MATED THREE TIMES AND THEN ULTRASONICALLY CLEANED FOR 1/2 MINUTE BEFORE PACKAGING AND SHIPPING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN R. Kaae DATE 14 June 63
CHECKED Leo Hlavins 25 June 63
APPROVAL S. Smith/W.T.
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL D. Hazeltine

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, ELECTRICAL
51 CONTACTS, PLUG & RECEPTACLE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010615
SCALE NONE
WT
SHEET 2 OF 4

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

B	1010615

REVISIONS 01792

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02481	8-7-63	WK.
B	REVISIED PER TDRR 12799	[illegible]	WK

REQUIREMENTS:

1. GENERAL:

   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

   B. CONNECTORS SHALL BE CAPABLE OF MEETING ALL REQUIREMENTS OF GROUP A AND GROUP B TESTS OF MIL-C-83848 IN ADDITION TO THE REQUIREMENTS SPECIFIED BELOW.

   C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED ON ND 1002052, UNLESS MODIFIED OR AMMENDED BY THE DESIGN REQUIREMENTS SECTION (3) OF THIS DRAWING.

   D. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.

2. INSPECTION AND ACCEPTANCE:

   A. MECHANICAL REQUIREMENTS

      (1) DIMENSIONAL AND MECHANICAL PARAMETERS: ALL DIMENSIONS SHALL CONFORM TO APPLICABLE DRAWINGS.

      (2) 100% INSPECTION: INSPECT OPTICALLY FOR EVIDENCE OF CRACKS, BURRS, VOIDS, FLAWS OR ANY FOREIGN MATTER DETRIMENTAL TO THE FUNCTION OF THE CONNECTOR. CONTACT MATING SURFACES SHALL BE FREE FROM CRACKS, BURRS, BENDS AND FOREIGN PARTICLES.

      (3) LEAD MATERIAL:

         (a) THE WIRE LEADS ON THE REAR OF THE RECEPTACLE SHALL CONFORM TO THE REQUIREMENTS OF ND 1015401. A CERTIFICATE OF COMPLIANCE SHALL BE SUBMITTED WITH EACH SHIPMENT.

         (b) THE LEAD MATERIAL FOR THE PLUG SHALL BE #26 TEFLON LEADS PER MIL-W-16878, TYPE ET, COLOR CODED.

      (4) MARKING: MARK EACH UNIT PER MIL-STD-130 WITH MANUFACTURERS SYMBOL, DATE OR LOT CODE, THE NASA DRAWING NUMBER AND REVISION LETTER. UNITS SHALL BE INDIVIDUALLY PACKED IN SEALED POLYETHYLENE FOR SHIPMENT IN ACCORDANCE WITH ND 1002215 CLASS I AND CONTAINERS MARKED WITH THE MANUFACTURERS NAME, NASA DRAWING NUMBER AND REVISION LETTER.

   B. ELECTRICAL REQUIREMENTS

      (1) INSULATION RESISTANCE: 1,000 MEGOHMS MINIMUM AT 500 VOLTS DC PER METHOD 302 OF MIL-STD-202.

      (2) DIELECTRIC STRENGTH, SEA LEVEL: 900 VOLTS RMS, PER METHOD 301 OF MIL-STD-202.

3. DESIGN REQUIREMENTS:

   A. ELECTRICAL

      (1) CURRENT RATING: THE CONTACTS SHALL BE RATED AT 3.0 AMPS MAX.

      (2) WORKING VOLTAGE: 250 VOLTS D.C.

      (3) DIELECTRIC WITHSTANDING VOLTAGE: PER METHOD 301 OF MIL-STD-202 (100,000 FT: 250 VOLTS RMS)

      (4) CONTACT RESISTANCE: WHEN MATED IN PAIRS THE CONTACT RESISTANCE AT 100MADC SHALL NOT EXCEED .01 OHMS MAX, PER MIL-STD-202 METHOD 307.

-1	PLUG	MALE CONTACTS
-2	RECEPTACLE	FEMALE CONTACTS

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 14 Jun 63
CHECKED Leo [illegible] 25 Jun 63
APPROVAL S. Smith/B.T.
APPROVAL
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, ELECTRICAL
51 CONTACTS, PLUG & RECEPTACLE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010615
SCALE NONE
WT
SHEET 1 OF 4

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 01792			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02481	8-7-63	wk
B	REVISED PER TDRR 12799	[illegible]	wk

12799

DESIGN REQUIREMENTS: (CONTINUED)

B. MECHANICAL

(1) OPERATING TEMPERATURE RANGE: -62°C TO +150°C

(2) INSULATING MATERIAL: DIALLYL PHTHALATE, GLASS FILLED PER MIL-M-19833, TYPE GDI-30

(3) INSERTION AND WITHDRAWAL: (WITH MATING CONNECTOR) INDIVIDUAL CONTACTS SHALL HAVE A MAXIMUM ENGAGEMENT FORCE OF 6 OUNCES AND A MINIMUM WITHDRAWAL FORCE OF .5 OUNCES. ASSEMBLIES SHALL NOT EXCEED A MATING FORCE EQUAL TO THE PRODUCT OF THE NUMBER OF CONTACTS X 7.5 OUNCES OR A WITHDRAWAL FORCE EQUAL TO THE PRODUCT OF THE NUMBER OF CONTACTS X 1 OUNCE INITIALLY - 0.5 OUNCES AFTER CONTACT LIFE.

(4) MATED CONNECTORS SHALL MEET THE VIBRATION REQUIREMENTS SPECIFIED IN ND 1002052 WITH THE ADDITIONAL REQUIREMENT THAT ANY DISCONTINUITY SHALL NOT EXCEED .05 MICROSECONDS MAX.

4. SPECIAL REQUIREMENTS:

A. CONTACT SEPARATION: (100% INSPECTION) ALL PIN CONTACTS SHALL BE TESTED WITH A STEEL TEST SLEEVE HAVING AN INSIDE DIAMETER OF .0235 ${}^{+.0000}_{-.0001}$ AND FINISH OF 16 MICRO-INCHES MAX. THE TOTAL WEIGHT OF THE TEST SLEEVE SHALL BE .5 OUNCES ${}^{+.1}_{-.0}$. WHEN THE ASSEMBLY IS INVERTED THE PIN CONTACT SHALL RETAIN THE .5 OUNCE WEIGHT. THIS TEST SHALL BE PERFORMED ON THE CONTACTS PRIOR TO ASSEMBLY WITH THE CONNECTOR BODY.

B. THE FOLLOWING REQUIREMENTS SHALL BE SUBJECTED TO LOT SAMPLE TESTS PRIOR TO SHIPMENT, AS NOTED.

(1) TENSILE STRENGTH:

THE CRIMPED ASSEMBLIES FROM EACH TOOL SHALL BE SAMPLED PER MIL-STD-105 INSPECTION LEVEL II, AQL .65. THE ASSEMBLIES SHALL BE TESTED ON A HUNTER SCALE FOR TENSILE STRENGTH AND THE READINGS SHALL BE RECORDED. ALL AVERAGES AND RANGES SHALL BE WITHIN THE CONTROL LIMITS STATED BELOW OR THE LOT SHALL BE REJECTED. ASSEMBLIES SHALL BE PACKAGED AND IDENTIFIED WITH THE LOT NUMBER, WHICH SHALL ACCOMPANY THE UNITS TO FINAL INSPECTION, AND BE INCLUDED WITH THE CONNECTOR SHIPMENT. THIS APPLIES TO BOTH PINS AND SOCKETS.

THERE SHALL BE TWO DATA SHEETS FOR THE CRIMPING OF THE PINS, ONE FOR THE PIN AND ONE DATA SHEET FOR THE WIRE END.

	PIN		SOCKET
WIRE SIZE	CONTACT END	WIRE END	WIRE END
# 26	3.0 lbs.	5.0 lbs.	5.0 lbs.

(2) SOCKET STRENGTH: SIDE LOAD (IN CONNECTOR): 18 OUNCES MINIMUM SHALL BE APPLIED AT THE PIN ENGAGING END OF THE SOCKET. INTERMATABILITY AND PERFORMANCE SHALL NOT BE IMPAIRED.

C. CLEANING: (100% INSPECTION) EACH CONNECTOR SHALL BE MATED THREE TIMES AND THEN ULTRASONICALLY CLEANED FOR 1/2 MINUTE BEFORE PACKAGING AND SHIPPING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 14 June, 63
CHECKED Leo J. [illegible] 25 June 63
APPROVAL S. Smith/H.T.
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, ELECTRICAL
51 CONTACTS, PLUG & RECEPTACLE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010615
SCALE NONE WT SHEET 2 OF 4

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010615 . B

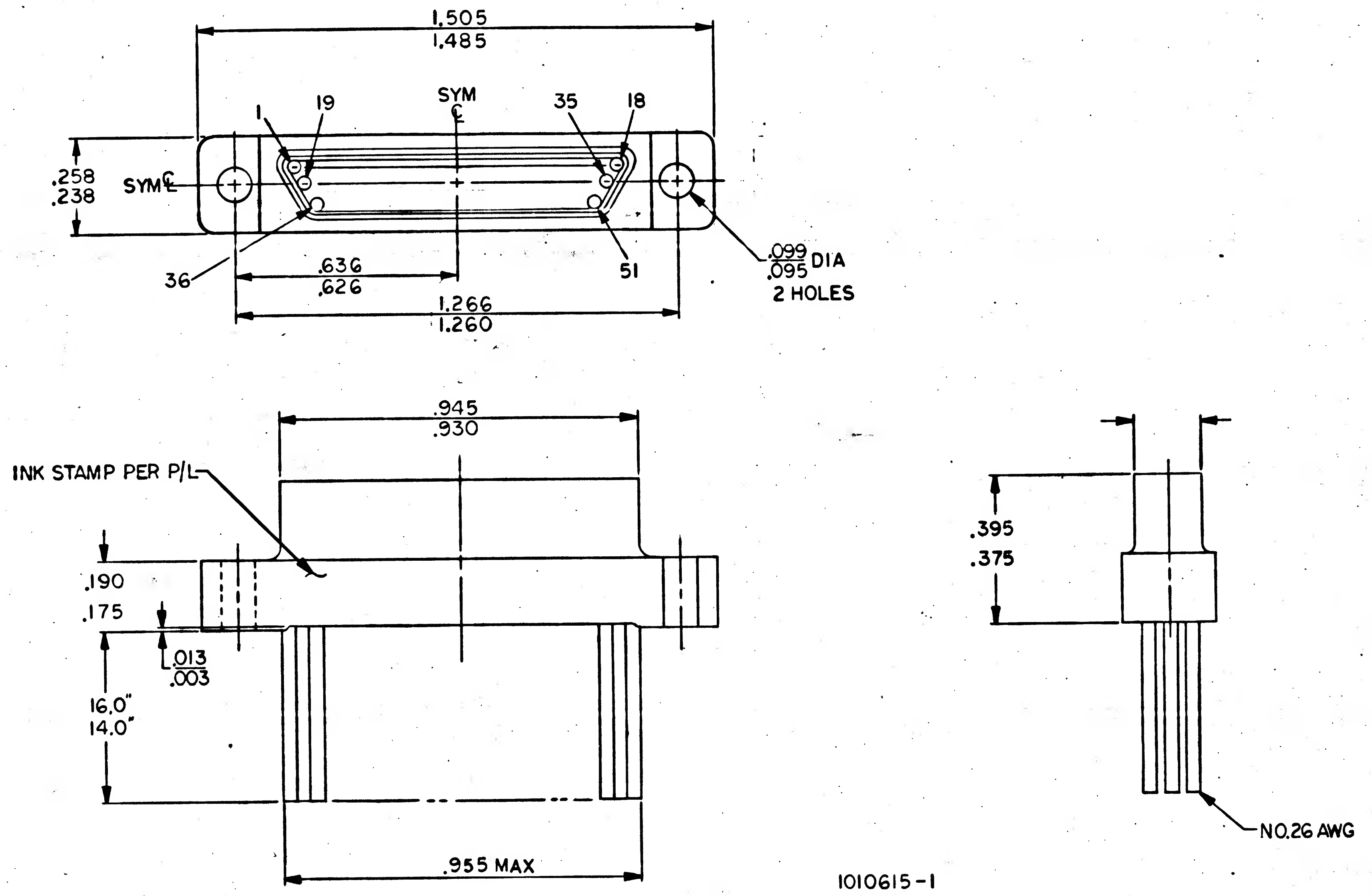
1010615	B

REVISIONS 01792

SYM	DESCRIPTION	DATE	APPROVAL
B	REVISED PER TDRR 12799	6/25/64	wk

COLOR CODE TABLE

PIN NO.	COLOR CODING	WIRE NO.
1	BLK	26AWG
2	BRN	↑
3	RED	
4	ORN	
5	YEL	
6	GRN	
7	BLU	
8	VIO	
9	GRAY	
10	WHITE	
11	WH/BLK	
12	WH/BRN	
13	WH/RED	
14	WH/ORN	
15	WH/YEL	
16	WH/GRN	
17	WH/BLU	
18	WH/VIO	
19	WH/GREY	
20	WH/BLK/BRN	
21	WH/BLK/RED	
22	WH/BLK/ORN	
23	WH/BLK/YEL	
24	WH/BLK/GRN	
25	WH/BLK/BLU	
26	WH/BLK/VIO	
27	WH/BLK/GREY	
28	WH/BRN/RED	
29	WH/BRN/ORN	
30	WH/BRN/YEL	
31	WH/BRN/GRN	
32	WH/BRN/BLU	
33	WH/BRN/VIO	
34	WH/BRN/GREY	
35	WH/RED/ORN	
36	WH/RED/YEL	
37	WH/RED/GRN	
38	WH/RED/BLU	
39	WH/RED/VIO	
40	WH/RED/GREY	
41	WH/ORN/YEL	
42	WH/ORN/GRN	
43	WH/ORN/BLU	
44	WH/ORN/VIO	
45	WH/ORN/GREY	
46	WH/YEL/GRN	
47	WH/YEL/BLU	
48	WH/YEL/VIO	
49	WH/YEL/GREY	
50	WH/GRN/BLU	↓
51	WH/GRN/VIO	26AWG



1010615-1

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kane DATE 14 June 63
CHECKED George J. Rod 25 Jun 63
APPROVAL S. Smith/BT.
APPROVAL
NASA APPROVAL Jack Barnes
MIT APPROVAL D. Hoag 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, ELECTRICAL
51 CONTACTS, PLUG
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010615
SCALE NONE
WT
SHEET 3 OF 4

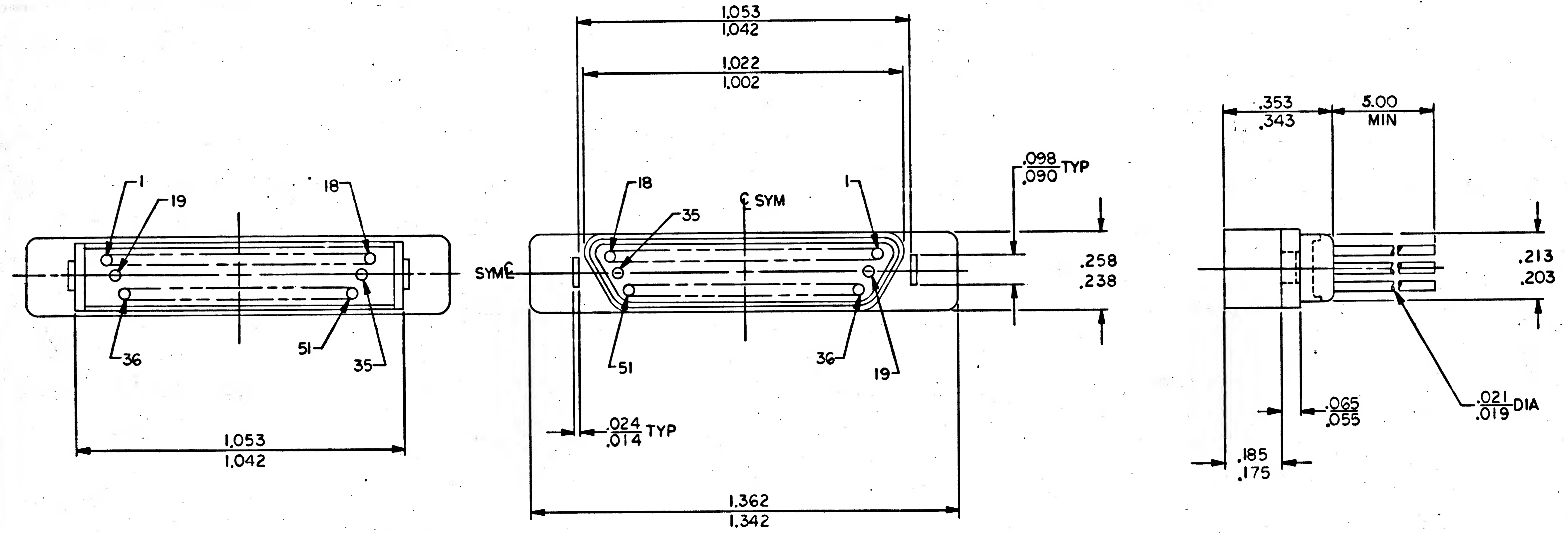
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

B 1010615 -

REVISIONS 0/792

SYM	DESCRIPTION	DATE	APPROVAL
B	REVISED PER TDRR 12799	9/29/64	WK



MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kene DATE 19 June 63
CHECKED Leo J Rice 25 Jun 63
APPROVAL S. Smith/R.T.
APPROVAL
NASA APPROVAL Jack Bassman
MIT APPROVAL D. Hoag 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, ELECTRICAL
51 CONTACTS, RECEPTACLE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010615
SCALE NONE
WT
SHEET 4 OF 4

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 01792

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02481	8-7-63	WK.
B	REVISIED PER TDRR 12799	9/29/64	WK
C	REVISED PER TDRR 16038	2/5/65	WK

REQUIREMENTS:

1. GENERAL:

   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

   B. CONNECTORS SHALL BE CAPABLE OF MEETING ALL REQUIREMENTS OF GROUP A AND GROUP B TESTS OF MIL-C-8384B IN ADDITION TO THE REQUIREMENTS SPECIFIED BELOW.

   C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED ON ND 1002052, UNLESS MODIFIED OR AMMENDED BY THE DESIGN REQUIREMENTS SECTION (3) OF THIS DRAWING.

   D. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.

2. INSPECTION AND ACCEPTANCE:

   A. MECHANICAL REQUIREMENTS

      (1) DIMENSIONAL AND MECHANICAL PARAMETERS: ALL DIMENSIONS SHALL CONFORM TO APPLICABLE DRAWINGS.

      (2) 100% INSPECTION: INSPECT OPTICALLY FOR EVIDENCE OF CRACKS, BURRS, VOIDS, FLAWS OR ANY FOREIGN MATTER DETRIMENTAL TO THE FUNCTION OF THE CONNECTOR. CONTACT MATING SURFACES SHALL BE FREE FROM CRACKS, BURRS, BENDS AND FOREIGN PARTICLES.

      (3) LEAD MATERIAL:

         (a) THE WIRE LEADS ON THE REAR OF THE RECEPTACLE SHALL CONFORM TO THE REQUIREMENTS OF ND 1015401. A CERTIFICATE OF COMPLIANCE SHALL BE SUBMITTED WITH EACH SHIPMENT.

         (b) THE LEAD MATERIAL FOR THE PLUG SHALL BE #26 TEFLON LEADS PER MIL-W-16878, TYPE ET, COLOR CODED.

      (4) PACKAGING AND PACKING: UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE MARKED WITH THE NASA DRAWING NUMBER, REVISION LETTER, DASH NUMBER, THE MANUFACTURER'S NAME OR SYMBOL, LOT OR SERIAL NUMBER AND THE MANUFACTURING DATE OR CODE. UNITS SHALL BE INDIVIDUALLY PACKAGED PER ND-1002215 CLASS 1, CODE 3.
      MARKING: THE MANUFACTURER'S NAME OR SYMBOL, NASA DRAWING NUMBER, DASH NUMBER, REVISION LETTER SHALL BE MARKED ON THE UNIT PER ND-1002019

   B. ELECTRICAL REQUIREMENTS

      (1) INSULATION RESISTANCE: 1,000 MEGOHMS MINIMUM AT 500 VOLTS DC PER METHOD 302 OF MIL-STD-202.

      (2) DIELECTRIC STRENGTH, SEA LEVEL: 900 VOLTS RMS, PER METHOD 301 OF MIL-STD-202.

-1	PLUG	MALE CONTACTS
-2	RECEPTACLE	FEMALE CONTACTS

3. DESIGN REQUIREMENTS:

   A. ELECTRICAL

      (1) CURRENT RATING: THE CONTACTS SHALL BE RATED AT 3.0 AMPS MAX.

      (2) WORKING VOLTAGE: 250 VOLTS D.C.

      (3) DIELECTRIC WITHSTANDING VOLTAGE: PER METHOD 301 OF MIL-STD-202 (100,000 FT: 250 VOLTS RMS)

      (4) CONTACT RESISTANCE: WHEN MATED IN PAIRS THE CONTACT RESISTANCE AT 100MADC SHALL NOT EXCEED .01 OHMS MAX, PER MIL-STD-202 METHOD 307.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 14 June 63
CHECKED Leo J. Bird 25 June 63
APPROVAL S. Smith/W.T.
APPROVAL
NASA APPROVAL
MIT APPROVAL L. Walsh 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, ELECTRICAL
51 CONTACTS, PLUG & RECEPTACLE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010615
SCALE NONE WT SHEET 1 OF 4

1010615 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

M	REVISIONS 01792		
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02481.	8-7-63	WK
B	REVISED PER TDRR 12799	9/29/64	WK
C	REVISED PER TDRR 16038	2/9/65	WK

DESIGN REQUIREMENTS: (CONTINUED)

B. MECHANICAL

(1) OPERATING TEMPERATURE RANGE: -62°C TO +150°C

(2) INSULATING MATERIAL: DIALLYL PHTHALATE, GLASS FILLED PER MIL-M-14 TYPE SDG

(3) INSERTION AND WITHDRAWAL: (WITH MATING CONNECTOR) INDIVIDUAL CONTACTS SHALL HAVE A MAXIMUM ENGAGEMENT FORCE OF 6 OUNCES AND A MINIMUM WITHDRAWAL FORCE OF .5 OUNCES. ASSEMBLIES SHALL NOT EXCEED A MATING FORCE EQUAL TO THE PRODUCT OF THE NUMBER OF CONTACTS X 7.5 OUNCES OR BE LESS THAN A MINIMUM WITHDRAWAL FORCE EQUAL TO THE PRODUCT OF THE NUMBER OF CONTACTS X1 OUNCE INITIALLY -0.5 OUNCES AFTER CONTACT LIFE.

(4) MATED CONNECTORS SHALL MEET THE VIBRATION REQUIREMENTS SPECIFIED IN ND 1002052 WITH THE ADDITIONAL REQUIREMENT THAT ANY DISCONTINUITY SHALL NOT EXCEED .1 MICROSECONDS MAX.

4. SPECIAL REQUIREMENTS:

A. CONTACT SEPARATION: (100% INSPECTION) ALL PIN CONTACTS SHALL BE TESTED WITH A STEEL TEST SLEEVE HAVING AN INSIDE DIAMETER OF $.0230\,^{+.0001}_{-.0000}$ AND FINISH OF 16 MICRO-INCHES MAX. THE TOTAL WEIGHT OF THE TEST SLEEVE SHALL BE $.5$ OUNCES $^{+.1}_{-.0}$. WHEN THE ASSEMBLY IS INVERTED THE PIN CONTACT SHALL RETAIN THE .5 OUNCE WEIGHT. THIS TEST SHALL BE PERFORMED SEQUENTIALLY ON EACH CONTACT AFTER ASSEMBLY WITH THE CONNECTOR BODY.

B. THE FOLLOWING REQUIREMENTS SHALL BE SUBJECTED TO LOT SAMPLE TESTS PRIOR TO SHIPMENT, AS NOTED.

(1) TENSILE STRENGTH:

THE CRIMPED ASSEMBLIES FROM EACH TOOL SHALL BE SAMPLED PER MIL-STD-414 INSPECTION LEVEL IV, AQL. 4 THE ASSEMBLIES SHALL BE TESTED FOR TENSILE STRENGTH AND THE READINGS SHALL BE RECORDED. ALL AVERAGES AND RANGES SHALL BE WITHIN THE CONTROL LIMITS STATED BELOW OR THE LOT SHALL BE REJECTED. ASSEMBLIES SHALL BE PACKAGED AND IDENTIFIED WITH THE LOT NUMBER, WHICH SHALL ACCOMPANY THE UNITS TO FINAL INSPECTION, AND BE INCLUDED WITH THE CONNECTOR SHIPMENT. THIS APPLIES TO BOTH PINS AND SOCKETS.
THERE SHALL BE TWO DATA SHEETS FOR THE CRIMPING OF THE PINS, ONE FOR THE PIN AND ONE DATA SHEET FOR THE WIRE END.

	PIN		SOCKET
WIRE SIZE	CONTACT END	WIRE END	WIRE END
# 26	3.0 lbs.	5.0 lbs.	5.0 lbs.

(2) SOCKET STRENGTH: SIDE LOAD (IN CONNECTOR): 18 OUNCES MINIMUM SHALL BE APPLIED AT THE PIN ENGAGING END OF THE SOCKET. INTERMATABILITY AND PERFORMANCE SHALL NOT BE IMPAIRED.

C. CLEANING: (100% INSPECTION) EACH CONNECTOR SHALL BE MATED THREE TIMES AND THEN ULTRASONICALLY CLEANED FOR 1/2 MINUTE BEFORE PACKAGING AND SHIPPING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 14 June, 63
CHECKED Leo Mann 25 June 63
APPROVAL S. Smith/W.T.
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL D Hazel 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, ELECTRICAL
51 CONTACTS, PLUG & RECEPTACLE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010615
SCALE NONE
WT
SHEET 2 OF 4

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

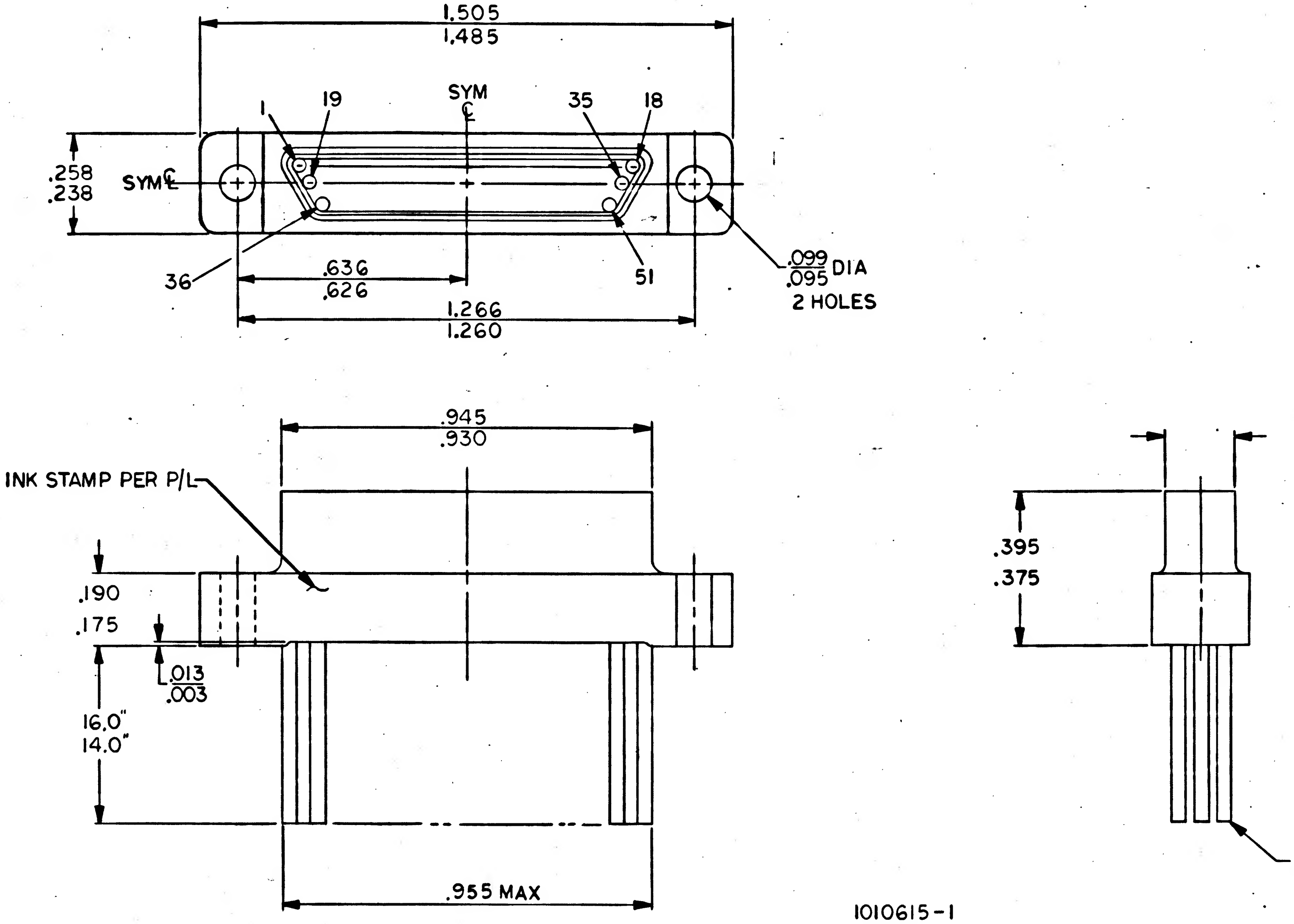
1010615 C

REVISIONS 01792

SYM	DESCRIPTION	DATE	APPROVAL
B	REVISED PER TDRR 12799	9/29/64	wk
C	REVISED PER TDRR 16038	2/8/65	wk

COLOR CODE TABLE

PIN NO.	COLOR CODING	WIRE NO.
1	BLK	26AWG
2	BRN	
3	RED	
4	ORN	
5	YEL	
6	GRN	
7	BLU	
8	VIO	
9	GRAY	
10	WHITE	
11	WH/BLK	
12	WH/BRN	
13	WH/RED	
14	WH/ORN	
15	WH/YEL	
16	WH/GRN	
17	WH/BLU	
18	WH/VIO	
19	WH/GREY	
20	WH/BLK/BRN	
21	WH/BLK/RED	
22	WH/BLK/ORN	
23	WH/BLK/YEL	
24	WH/BLK/GRN	
25	WH/BLK/BLU	
26	WH/BLK/VIO	
27	WH/BLK/GREY	
28	WH/BRN/RED	
29	WH/BRN/ORN	
30	WH/BRN/YEL	
31	WH/BRN/GRN	
32	WH/BRN/BLU	
33	WH/BRN/VIO	
34	WH/BRN/GREY	
35	WH/RED/ORN	
36	WH/RED/YEL	
37	WH/RED/GRN	
38	WH/RED/BLU	
39	WH/RED/VIO	
40	WH/RED/GREY	
41	WH/ORN/YEL	
42	WH/ORN/GRN	
43	WH/ORN/BLU	
44	WH/ORN/VIO	
45	WH/ORN/GREY	
46	WH/YEL/GRN	
47	WH/YEL/BLU	
48	WH/YEL/VIO	
49	WH/YEL/GREY	
50	WH/GRN/BLU	
51	WH/GRN/VIO	26AWG



1010615-1

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
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CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kane DATE 14 June 63
CHECKED George J Rood 25 Jun 63
APPROVAL S. Smith/MT.
APPROVAL
NASA APPROVAL
MIT APPROVAL D Hoag 6/26/63

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HOUSTON, TEXAS

CONNECTOR, ELECTRICAL
51 CONTACTS, PLUG
SPECIFICATION CONTROL DRAWING

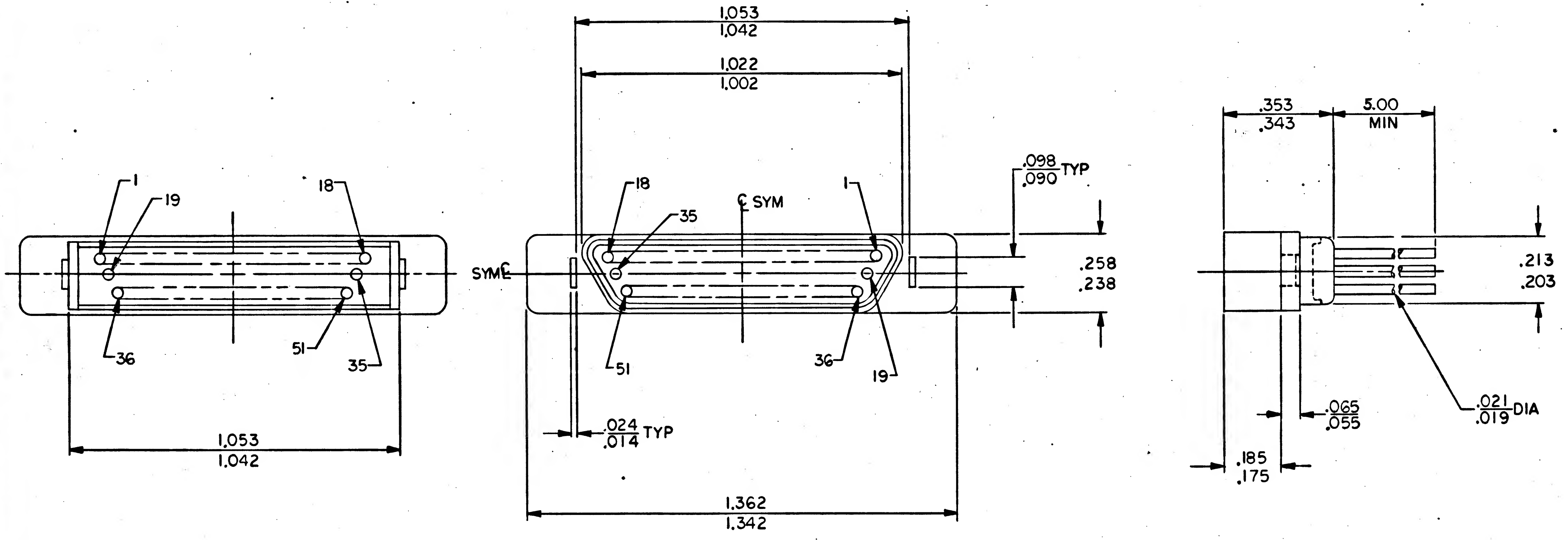
CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010615
SCALE NONE
WT
SHEET 3 OF 4

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010615 - C

REVISIONS 01792

SYM	DESCRIPTION	DATE	APPROVAL
B	REVISED PER TDRR 12799	9/15/64	WK
C	REVISED PER TDRR 16038	4/8/65	WK



MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
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DWG. NO. CONTRACT

DRAWN R. Kene DATE 19 June 63
CHECKED Geo J Rice 25 Jun 63
APPROVAL S. Smith/R.T.
APPROVAL
NASA APPROVAL Jack Brennan
MIT APPROVAL D. Hoag 6/26/63

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HOUSTON, TEXAS

CONNECTOR, ELECTRICAL
51 CONTACTS, RECEPTACLE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010615
SCALE NONE WT SHEET 4 OF 4

1010615 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010615 E

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REVISIONS 01792			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02481	8-7-63	WK.
B	REVISIED PER TDRR 12799	1/29/64	WK
C	REVISED PER TDRR 16038	2/5/65	WK
D	REVISED PER TDRR 19138	5/26/65	WK
E	REVISED PER TDRR 23869	11/4/65	WK

REQUIREMENTS:

1. GENERAL:

   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

   B. CONNECTORS SHALL BE CAPABLE OF MEETING ALL REQUIREMENTS OF GROUP A AND GROUP B TESTS OF MIL-C-83848 IN ADDITION TO THE REQUIREMENTS SPECIFIED BELOW.

   C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED ON ND 1002052, UNLESS MODIFIED OR AMMENDED BY THE DESIGN REQUIREMENTS SECTION (3) OF THIS DRAWING.

   D. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.

2. INSPECTION AND ACCEPTANCE:

   A. MECHANICAL REQUIREMENTS

      (1) DIMENSIONAL AND MECHANICAL PARAMETERS: ALL DIMENSIONS SHALL CONFORM TO APPLICABLE DRAWINGS.

      (2) 100% INSPECTION: INSPECT OPTICALLY FOR EVIDENCE OF CRACKS, BURRS, VOIDS, FLAWS OR ANY FOREIGN MATTER DETRIMENTAL TO THE FUNCTION OF THE CONNECTOR. CONTACT MATING SURFACES SHALL BE FREE FROM CRACKS, BURRS, BENDS AND FOREIGN PARTICLES.

      (3) LEAD MATERIAL:

         (a) THE WIRE LEADS ON THE REAR OF THE RECEPTACLE SHALL CONFORM TO THE REQUIREMENTS OF ND 1015401. A CERTIFICATE OF COMPLIANCE SHALL BE SUBMITTED WITH EACH SHIPMENT.

         (b) THE LEAD MATERIAL FOR THE PLUG SHALL BE #26 TEFLON LEADS PER MIL-W-16878, TYPE ET, COLOR CODED.

      (4) PACKAGING AND PACKING: UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE MARKED WITH THE NASA PART NUMBER, THE MANUFACTURER'S NAME OR SYMBOL, LOT OR SERIAL NUMBER AND THE MANUFACTURING DATE OR CODE. UNITS SHALL BE INDIVIDUALLY PACKAGED PER ND-1002215 CLASS 1, CODE 3.
      MARKING: THE MANUFACTURER'S NAME AND/OR SYMBOL AND NASA PART NUMBER SHALL BE MARKED ON THE UNIT PER ND-1002019

   B. ELECTRICAL REQUIREMENTS

      (1) INSULATION RESISTANCE: 1,000 MEGOHMS MINIMUM AT 500 VOLTS DC PER METHOD 302 OF MIL-STD-202.

      (2) DIELECTRIC STRENGTH, SEA LEVEL: 900 VOLTS RMS, PER METHOD 301 OF MIL-STD-202.

3. DESIGN REQUIREMENTS:

   A. ELECTRICAL

      (1) CURRENT RATING: THE CONTACTS SHALL BE RATED AT 3.0 AMPS MAX.

      (2) WORKING VOLTAGE: 250 VOLTS D.C.

      (3) DIELECTRIC WITHSTANDING VOLTAGE: PER METHOD 301 OF MIL-STD-202 (100,000 FT: 250 VOLTS RMS)

      (4) CONTACT RESISTANCE: WHEN MATED IN PAIRS THE CONTACT RESISTANCE AT 100MADC SHALL NOT EXCEED .01 OHMS MAX, PER MIL-STD-202 METHOD 307.

-1	PLUG	MALE CONTACTS
-2	RECEPTACLE	FEMALE CONTACTS

PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 14 June 63
CHECKED Geo Price 25 June 63
APPROVAL S. Smith /DT
APPROVAL
NASA APPROVAL
MIT APPROVAL D. Hoag 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, ELECTRICAL
51 CONTACTS, PLUG & RECEPTACLE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010615
SCALE NONE
WT
SHEET 1 OF 4

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 01792			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02481.	8-7-63	WK
B	REVISED PER TDRR 12799	9/15/64	WK
C	REVISED PER TDRR 16038	2/9/65	WK
D	REVISED PER TDRR 19138	5/26/65	WK
E	REVISED PER TDRR 23869	11/16/65	WK

DESIGN REQUIREMENTS: (CONTINUED)

B. MECHANICAL

(1) OPERATING TEMPERATURE RANGE: −55°C TO +150°C

(2) INSULATING MATERIAL: DIALLYL PHTHALATE, GLASS FILLED PER MIL-M-14 TYPE SDG

(3) INSERTION AND WITHDRAWAL: (WITH MATING CONNECTOR) INDIVIDUAL CONTACTS SHALL HAVE A MAXIMUM ENGAGEMENT FORCE OF 6 OUNCES AND A MINIMUM WITHDRAWAL FORCE OF .5 OUNCES. ASSEMBLIES SHALL NOT EXCEED A MATING FORCE EQUAL TO THE PRODUCT OF THE NUMBER OF CONTACTS X 7.5 OUNCES OR BE LESS THAN A MINIMUM WITHDRAWAL FORCE EQUAL TO THE PRODUCT OF THE NUMBER OF CONTACTS X1 OUNCE INITIALLY -0.5 OUNCES AFTER CONTACT LIFE.

(4) MATED CONNECTORS SHALL MEET THE VIBRATION REQUIREMENTS SPECIFIED IN ND 1002052 WITH THE ADDITIONAL REQUIREMENT THAT ANY DISCONTINUITY SHALL NOT EXCEED .1 MICROSECONDS MAX.

4. SPECIAL REQUIREMENTS:

A. CONTACT SEPARATION: (100% INSPECTION) ALL PIN CONTACTS SHALL BE TESTED WITH A STEEL TEST SLEEVE HAVING AN INSIDE DIAMETER OF $.0230^{+.0001}_{-.0000}$ AND FINISH OF 16 MICRO-INCHES MAX. THE TOTAL WEIGHT OF THE TEST SLEEVE SHALL BE .5 OUNCES $^{+.1}_{-.0}$. WHEN THE ASSEMBLY IS INVERTED THE PIN CONTACT SHALL RETAIN THE .5 OUNCE WEIGHT. THIS TEST SHALL BE PERFORMED SEQUENTIALLY ON EACH CONTACT AFTER ASSEMBLY WITH THE CONNECTOR BODY.

B. THE FOLLOWING REQUIREMENTS SHALL BE SUBJECTED TO LOT SAMPLE TESTS PRIOR TO SHIPMENT, AS NOTED.

(1) TENSILE STRENGTH:

THE CRIMPED ASSEMBLIES FROM EACH TOOL SHALL BE SAMPLED PER MIL-STD-414 INSPECTION LEVEL IV, AQL. 4 THE ASSEMBLIES SHALL BE TESTED FOR TENSILE STRENGTH AND THE READINGS SHALL BE RECORDED. ALL AVERAGES AND RANGES SHALL BE WITHIN THE CONTROL LIMITS STATED BELOW OR THE LOT SHALL BE REJECTED. ASSEMBLIES SHALL BE PACKAGED AND IDENTIFIED WITH THE LOT NUMBER, WHICH SHALL ACCOMPANY THE UNITS TO FINAL INSPECTION, AND BE INCLUDED WITH THE CONNECTOR SHIPMENT. THIS APPLIES TO BOTH PINS AND SOCKETS. THERE SHALL BE TWO DATA SHEETS FOR THE CRIMPING OF THE PINS, ONE FOR THE PIN AND ONE DATA SHEET FOR THE WIRE END.

	PIN		SOCKET
WIRE SIZE	CONTACT END	WIRE END	WIRE END
# 26	3.0 lbs.	5.0 lbs.	5.0 lbs.

(2) SOCKET STRENGTH: SIDE LOAD (IN CONNECTOR): 18 OUNCES MINIMUM SHALL BE APPLIED AT THE PIN ENGAGING END OF THE SOCKET. INTERMATABILITY AND PERFORMANCE SHALL NOT BE IMPAIRED.

C. MATING & CLEANING: (100% INSPECTION) EACH CONNECTOR SHALL BE MATED 5 TIMES AND THEN ULTRASONICALLY CLEANED FOR 1/2 MINUTE. INSPECT FOR LOOSE, CRUSHED OR MISALIGNMENT OF CONTACTS.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kane DATE 14 June 63
CHECKED Leo J. Marr 25 June 63
APPROVAL S. Smith/W.T.
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL D. Hazel Wicks

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, ELECTRICAL
51 CONTACTS, PLUG & RECEPTACLE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010615
SCALE NONE
WT
SHEET 2 OF 4

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

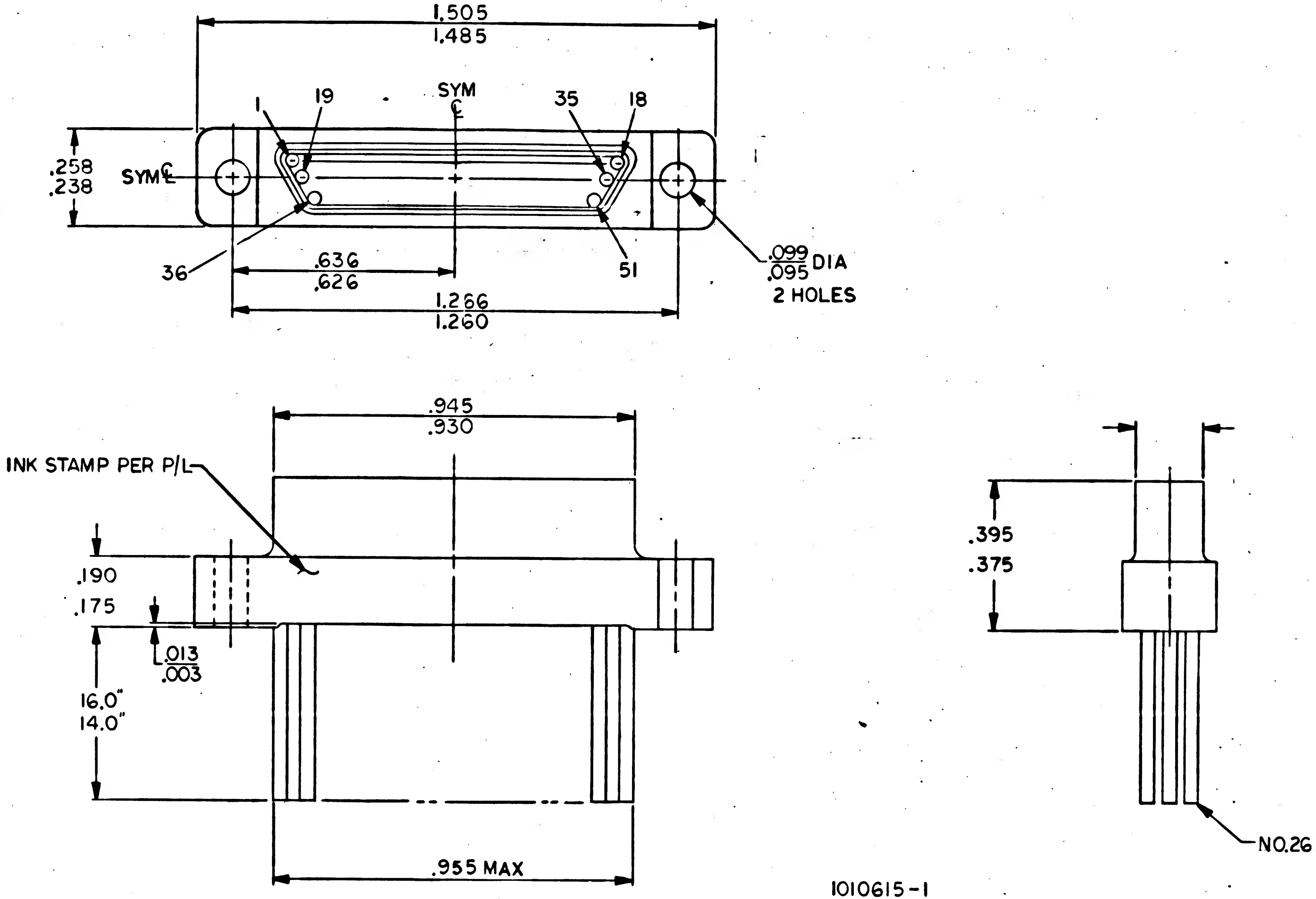
E 1010615

REVISIONS 01792

SYM	DESCRIPTION	DATE	APPROVAL
B	REVISED PER TDRR 12799	9/29/64	WK
C	REVISED PER TDRR 16038	2/8/65	WK
D	REVISED PER TDRR 19138	5/26/65	WK
E	REVISED PER TDRR 23869	11/16/65	WK

COLOR CODE TABLE

PIN NO.	COLOR CODING	WIRE NO.
1	BLK	26AWG
2	BRN	↑
3	RED	
4	ORN	
5	YEL	
6	GRN	
7	BLU	
8	VIO	
9	GRAY	
10	WHITE	
11	WH/BLK	
12	WH/BRN	
13	WH/RED	
14	WH/ORN	
15	WH/YEL	
16	WH/GRN	
17	WH/BLU	
18	WH/VIO	
19	WH/GREY	
20	WH/BLK/BRN	
21	WH/BLK/RED	
22	WH/BLK/ORN	
23	WH/BLK/YEL	
24	WH/BLK/GRN	
25	WH/BLK/BLU	
26	WH/BLK/VIO	
27	WH/BLK/GREY	
28	WH/BRN/RED	
29	WH/BRN/ORN	
30	WH/BRN/YEL	
31	WH/BRN/GRN	
32	WH/BRN/BLU	
33	WH/BRN/VIO	
34	WH/BRN/GREY	
35	WH/RED/ORN	
36	WH/RED/YEL	
37	WH/RED/GRN	
38	WH/RED/BLU	
39	WH/RED/VIO	
40	WH/RED/GREY	
41	WH/ORN/YEL	
42	WH/ORN/GRN	
43	WH/ORN/BLU	
44	WH/ORN/VIO	
45	WH/ORN/GREY	
46	WH/YEL/GRN	
47	WH/YEL/BLU	
48	WH/YEL/VIO	
49	WH/YEL/GREY	
50	WH/GRN/BLU	↓
51	WH/GRN/VIO	26AWG



1010615-1

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
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DWG. NO. CONTRACT

DRAWN R. Kane DATE 14 June 63
CHECKED George J Rood 25 Jun 63
APPROVAL S. Smith/BT.
APPROVAL
NASA APPROVAL Jack Barnes
MIT APPROVAL D Hoag 6/26/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, ELECTRICAL
51 CONTACTS, PLUG & RECEPTACLE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010615
SCALE NONE
WT
SHEET 3 OF 4

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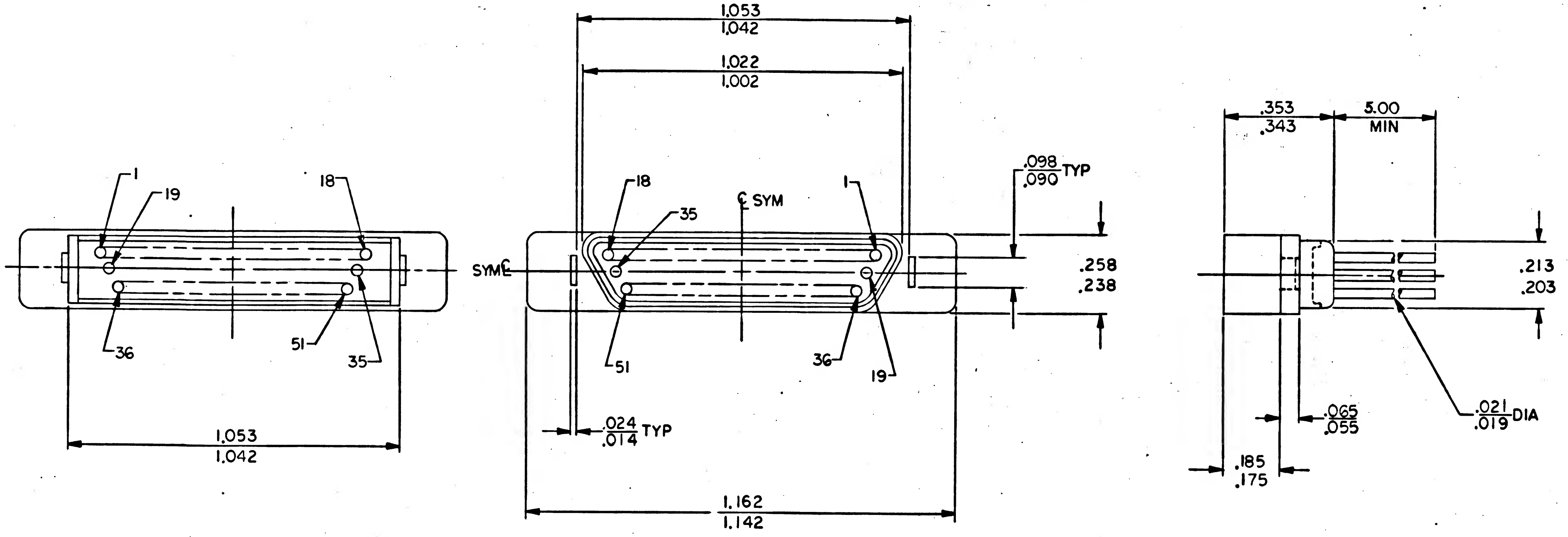
1010615 - E

REVISIONS 0/792

SYM	DESCRIPTION	DATE	APPROVAL
B	REVISED PER TDRR 12799	9/29/64	WK
C	REVISED PER TDRR 16038	2/9/65	WK
D	REVISED PER TDRR 19138	5/26/65	WK
E	REVISED PER TDRR 23869	11/16/66	WK



1010615-2

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON

APPLICATION

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DRAWN R. Kane DATE 19 June 63
CHECKED Geo J Rice 25 Jun 63
APPROVAL S. Smith/R.T.
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL D. Hoag 6/26/63

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CONNECTOR, ELECTRICAL
51 CONTACTS, PLUG & RECEPTACLE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80320
SIZE C
NASA DRAWING NO. 1010615
SCALE NONE
WT
SHEET 4 OF 4

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1010615

REVISIONS 01792			
SYM	DESCRIPTION	DATE	APPROVAL

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

B. CONNECTORS SHALL BE CAPABLE OF MEETING THE APPLICABLE REQUIREMENTS OF MIL-C-21617 IN ADDITION TO THE REQUIREMENTS SPECIFIED BELOW.

C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED ON ND 1002052, UNLESS MODIFIED OR AMMENDED BY THE DESIGN REQUIREMENTS SECTION (3) OF THIS DRAWING.

D. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.

2. INSPECTION AND ACCEPTANCE:

A. MECHANICAL REQUIREMENTS

(1) DIMENSIONAL AND MECHANICAL PARAMETERS: ALL DIMENSIONS SHALL CONFORM TO APPLICABLE DRAWINGS.

(2) 100% INSPECTION: INSPECT OPTICALLY FOR EVIDENCE OF CRACKS, BURRS, VOIDS, FLAWS OR ANY FOREIGN MATTER DETRIMENTAL TO THE FUNCTION OF THE CONNECTOR. CONTACT MATING SURFACES SHALL BE FREE FROM CRACKS, BURRS, BENDS AND FOREIGN PARTICLES.

(3) LEAD MATERIAL:

(a) THE WIRE LEADS ON THE REAR OF THE RECEPTACLE SHALL CONFORM TO THE REQUIREMENTS OF ND 1015401. A CERTIFICATE OF COMPLIANCE SHALL BE SUBMITTED WITH EACH SHIPMENT.

(b) THE LEAD MATERIAL FOR THE PLUG SHALL BE #26 TEFLON LEADS PER MIL-W-16878, TYPE ET, COLOR CODED.

(4) MARKING: MARK EACH UNIT PER MIL-STD-130 WITH MANUFACTURERS SYMBOL, DATE OR LOT CODE, THE NASA DRAWING NUMBER AND REVISION LETTER. UNITS SHALL BE INDIVIDUALLY PACKED IN SEALED POLYETHYLENE FOR SHIPMENT IN ACCORDANCE WITH MIL-E-17555, LEVEL B AND CONTAINERS MARKED WITH THE MANUFACTURERS NAME, NASA DRAWING NUMBER AND REVISION LETTER.

B. ELECTRICAL REQUIREMENTS

(1) INSULATION RESISTANCE: 1,000 MEGOHMS MINIMUM AT 500 VOLTS DC PER METHOD 302 OF MIL-STD-202.

(2) DIELECTRIC STRENGTH, SEA LEVEL: 900 VOLTS RMS, PER METHOD 301 OF MIL-STD-202.

3. DESIGN REQUIREMENTS:

A. ELECTRICAL

(1) CURRENT RATING: THE CONTACTS SHALL BE RATED AT 3.0 AMPS MAX.

(2) WORKING VOLTAGE: 250 VOLTS D.C.

(3) FLASHOVER VOLTAGE: RATED AT 1200 V.A.C. R.M.S.

(4) DIELECTRIC WITHSTANDING VOLTAGE: PER METHOD 301 OF MIL-STD-202 (100,000 FT: 500 VOLTS RMS)

(5) CONTACT RESISTANCE: WHEN MATED IN PAIRS THE CONTACT RESISTANCE AT 100MADC SHALL NOT EXCEED .01 OHMS MAX, PER MIL-STD-202 METHOD 307.

-1	PLUG	MALE CONTACTS
-2	RECEPTACLE	FEMALE CONTACTS

SHEET 1	SHEET 2	SHEET 3	SHEET 4
REVISION STATUS OF SHEETS			

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

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MATERIAL
HEAT TREATMENT
FINAL FINISH

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DWG. NO. CONTRACT
DRAWN R. Kane DATE 14 June 63
CHECKED Geo [illegible] 25 June 63
APPROVAL S. Smith/W.T.
APPROVAL
NASA APPROVAL
MIT APPROVAL [illegible] 6/26/63

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HOUSTON, TEXAS

CONNECTOR, ELECTRICAL
51 CONTACTS, PLUG & RECEPTACLE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010615
SCALE NONE WT SHEET 1 OF 4

1010615

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS 01792			
SYM	DESCRIPTION	DATE	APPROVAL

DESIGN REQUIREMENTS: (CONTINUED)

B. MECHANICAL

(1) OPERATING TEMPERATURE RANGE: -62°C TO +150°C

(2) INSULATING MATERIAL: DIALLYL PHTHALATE, GLASS FILLED PER MIL-M-14 TYPE SDG.

(3) INSERTION AND WITHDRAWAL: (WITH MATING CONNECTOR) INDIVIDUAL CONTACTS SHALL HAVE A MAXIMUM ENGAGEMENT FORCE OF 6 OUNCES AND A MINIMUM WITHDRAWAL FORCE OF .5 OUNCES. ASSEMBLIES SHALL NOT EXCEED A MATING FORCE EQUAL TO THE PRODUCT OF THE NUMBER OF CONTACTS X 7.5 OUNCES OR A WITHDRAWAL FORCE EQUAL TO THE PRODUCT OF THE NUMBER OF CONTACTS X 1 OUNCE.

(4) MATED CONNECTORS SHALL MEET THE VIBRATION REQUIREMENTS SPECIFIED IN ND 1002052 WITH THE ADDITIONAL REQUIREMENT THAT ANY DISCONTINUITY SHALL NOT EXCEED .05 MICROSECONDS MAX.

4. SPECIAL REQUIREMENTS:

A. CONTACT SEPARATION: (100% INSPECTION) ALL PIN CONTACTS SHALL BE TESTED WITH A STEEL TEST SLEEVE HAVING AN INSIDE DIAMETER OF $.0235\,^{+.0000}_{-.0001}$ AND FINISH OF 16 MICRO-INCHES MAX. THE TOTAL WEIGHT OF THE TEST SLEEVE SHALL BE .5 OUNCES $^{+.1}_{-.0}$. WHEN THE ASSEMBLY IS INVERTED THE PIN CONTACT SHALL RETAIN THE .5 OUNCE WEIGHT. THIS TEST SHALL BE PERFORMED ON THE CONTACTS PRIOR TO ASSEMBLY WITH THE CONNECTOR BODY.

B. THE FOLLOWING REQUIREMENTS SHALL BE SUBJECTED TO LOT SAMPLE TESTS PRIOR TO SHIPMENT, AS NOTED.

(1) TENSILE STRENGTH:

THE CRIMPED ASSEMBLIES FROM EACH TOOL SHALL BE SAMPLED PER MIL-STD-105 INSPECTION LEVEL II, AQL .65 . THE ASSEMBLIES SHALL BE TESTED ON A HUNTER SCALE FOR TENSILE STRENGTH AND THE READINGS SHALL BE RECORDED. ALL AVERAGES AND RANGES SHALL BE WITHIN THE CONTROL LIMITS STATED BELOW OR THE LOT SHALL BE REJECTED. ASSEMBLIES SHALL BE PACKAGED AND IDENTIFIED WITH THE LOT NUMBER, WHICH SHALL ACCOMPANY THE UNITS TO FINAL INSPECTION, AND BE INCLUDED WITH THE CONNECTOR SHIPMENT. . THIS APPLIES TO BOTH PINS AND SOCKETS.

THERE SHALL BE TWO DATA SHEETS FOR THE CRIMPING OF THE PINS, ONE FOR THE PIN AND ONE DATA SHEET FOR THE WIRE END.

	PIN		SOCKET
WIRE SIZE	CONTACT END	WIRE END	WIRE END
# 28	3.0 lbs.	5.0 lbs.	5.0 lbs.

C. CLEANING: (100% INSPECTION) EACH CONNECTOR SHALL BE MATED THREE TIMES AND THEN ULTRASONICALLY CLEANED FOR 1/2 MINUTE BEFORE PACKAGING AND SHIPPING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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MATERIAL
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DWG. NO. CONTRACT
DRAWN R. Kane DATE 14 June 63
CHECKED 25 June 63
APPROVAL S. Smith/H.T.
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL 6/26/63

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HOUSTON, TEXAS

CONNECTOR, ELECTRICAL
51 CONTACTS, PLUG & RECEPTACLE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010615
SCALE NONE
WT
SHEET 2 OF 4

INCHES
0 1 2
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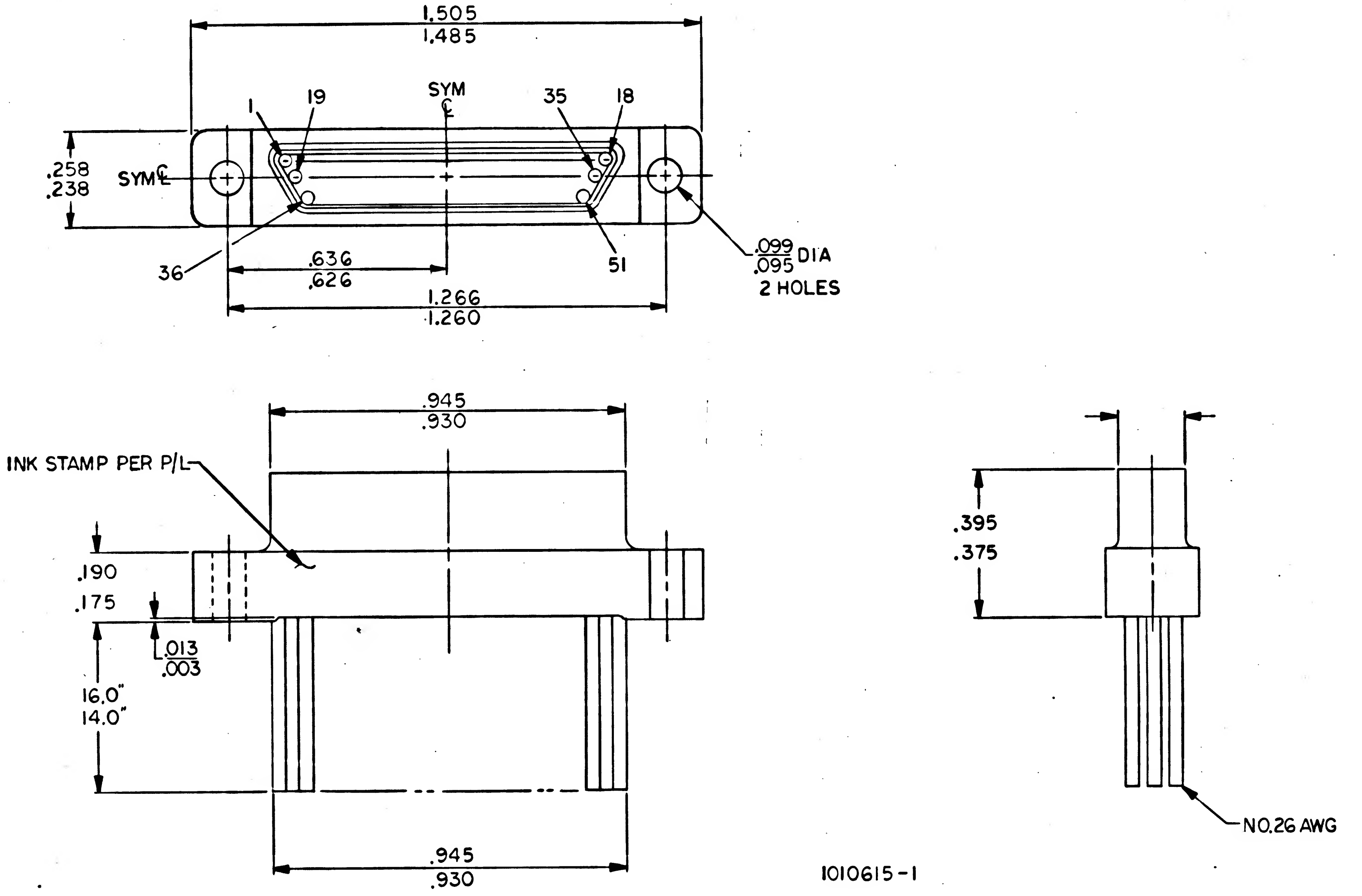
1010615

REVISIONS 0792			
SYM	DESCRIPTION	DATE	APPROVAL

COLOR CODE TABLE

PIN NO.	COLOR CODING	WIRE NO.
1	BLK	26AWG
2	BRN	
3	RED	
4	ORN	
5	YEL	
6	GRN	
7	BLU	
8	VIO	
9	GRAY	
10	WHITE	
11	WH/BLK	
12	WH/BRN	
13	WH/RED	
14	WH/ORN	
15	WH/YEL	
16	WH/GRN	
17	WH/BLU	
18	WH/VIO	
19	WH/GREY	
20	WH/BLK/BRN	
21	WH/BLK/RED	
22	WH/BLK/ORN	
23	WH/BLK/YEL	
24	WH/BLK/GRN	
25	WH/BLK/BLU	
26	WH/BLK/VIO	
27	WH/BLK/GREY	
28	WH/BRN/RED	
29	WH/BRN/ORN	
30	WH/BRN/YEL	
31	WH/BRN/GRN	
32	WH/BRN/BLU	
33	WH/BRN/VIO	
34	WH/BRN/GREY	
35	WH/RED/ORN	
36	WH/RED/YEL	
37	WH/RED/GRN	
38	WH/RED/BLU	
39	WH/RED/VIO	
40	WH/RED/GREY	
41	WH/ORN/YEL	
42	WH/ORN/GRN	
43	WH/ORN/BLU	
44	WH/ORN/VIO	
45	WH/ORN/GREY	
46	WH/YEL/GRN	
47	WH/YEL/BLU	
48	WH/YEL/VIO	
49	WH/YEL/GREY	
50	WH/GRN/BLU	
51	WH/GRN/VIO	26AWG



1010615-1

MASTER

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LIST OF MATERIALS

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APPROVAL
NASA APPROVAL Jack Barrow
MIT APPROVAL D. Hoag 6/26/63

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CONNECTOR, ELECTRICAL
51 CONTACTS, PLUG
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010615
SCALE NONE
WT
SHEET 3 OF 4

1010615

INCHES
0 1 2
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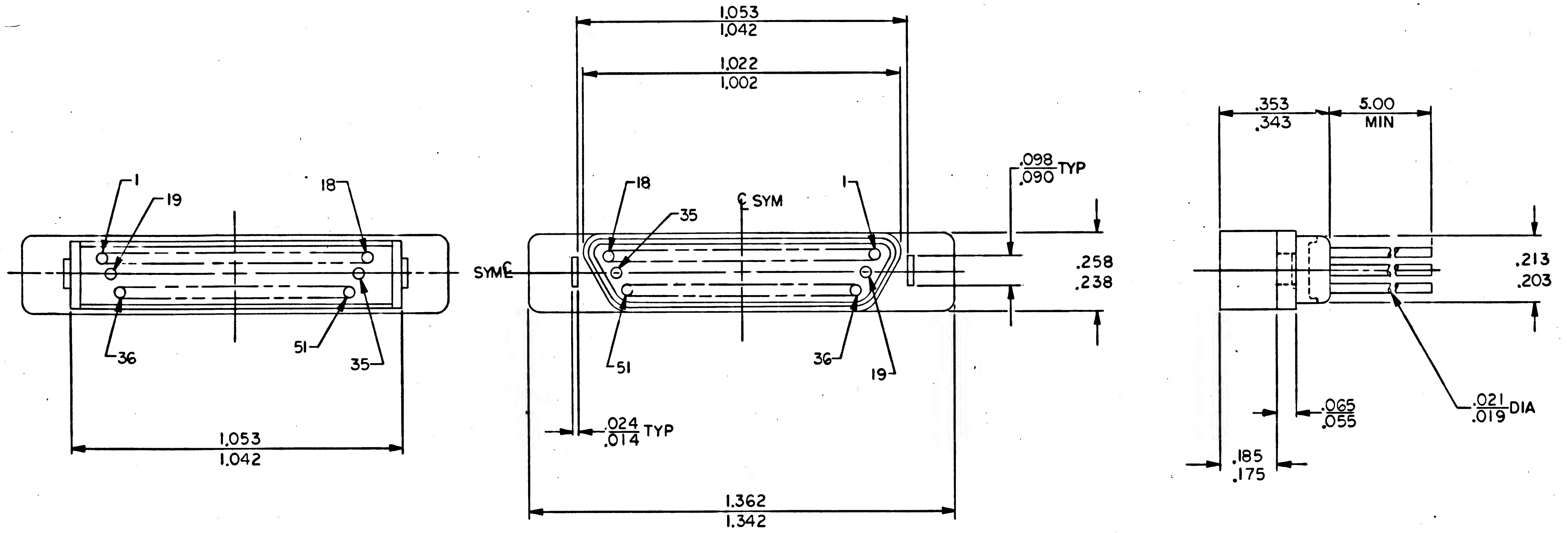
REVISIONS 01792			
SYM	DESCRIPTION	DATE	APPROVAL



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

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APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
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APPROVAL
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CONNECTOR, ELECTRICAL
51 CONTACTS, RECEPTACLE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010615
SCALE NONE
WT
SHEET 4 OF 4

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010615

1010617

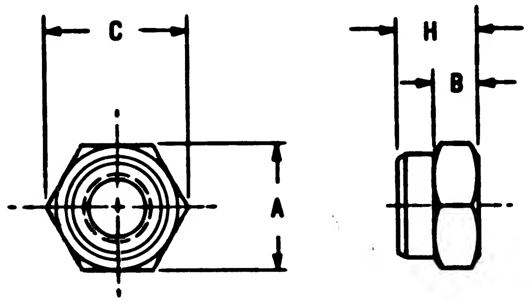
REVISIONS

SYM	DESCRIPTION	DATE	APPD.
-	INITIAL RELEASE CLASS A PER TDRR 02739	8/21/63	

REQUIREMENTS:

1. **GENERAL:**
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. PERFORMANCE PER MIL-N-25027 AS APPLICABLE.
   - D. PACKAGING AND PACKING: UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE MARKED WITH THE DRAWING NUMBER (1010617), REVISION LETTER, DASH NUMBER (IF ANY) AND THE MANUFACTURER'S NAME OR SYMBOL.
2. INSPECTION AND ACCEPTANCE:
   - A. DIMENSIONS: AS SHOWN IN TABLE.
3. DESIGN REQUIREMENTS:
   - A. MATERIAL: 18-8 CORROSION RESISTANT STEEL PER QQ-S-763 OR MIL-S-7720.
   - B. FINISH: PASSIVATE PER MIL-F-14072, E300

PART NUMBER	THREAD SIZE	A	B (REF)	C MIN	H +.002 -.003
-2	2-56NC-3B	.156	.067	.171	.105
-4	4-40NC-3B	.188	.071	.207	.120



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NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	+.010	+ —
— —	—.010	— —

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MATERIAL
SEE NOTES

CONTRACT

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DRAWN Janowrak DATE 21 MAY 63
CHECKED W. Diehl 21 MAY 63
APPROVAL A.J. for G. MAYO 8/20/63
APPROVAL
NASA APPROVAL 8/21/63
MIT APPROVAL 8/21/63

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NUT-HEXAGON, SELF LOCKING,
MINIATURE
(COARSE, CLASS 3B, NC)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C 1010617

SCALE NONE SHEET 1 OF 1

INCHES
0 1 2
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1010618 A

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A 02336	7/31/63	
A	REVISED PER TDRR 25367		

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

SCREWS SHALL BE BURR FREE.

SCREWS SHALL MEET THE PERFORMANCE REQUIREMENTS AS OUTLINED IN MIL-F-18240.

PACKAGES SHALL BE MARKED WITH THE NASA DRAWING NO. DASH NO. AND REV. LETTER.

INSPECTION AND ACCEPTANCE:

MATERIAL: 18-8 OR 16-18 CORROSION RESISTANT STEEL, PER QQ-S-763 OR PER FF-S-86 (75,000 PSI MIN. ULT. TEN. STR.)

FINISH: PASSIVATE PER MIL-F-14072,E300.

INSERT SHALL MEET THE REQUIREMENTS OUTLINED IN MIL-F-18240, TYPE B

THREADS SHALL BE IN ACCORDANCE WITH MIL-S-7742.

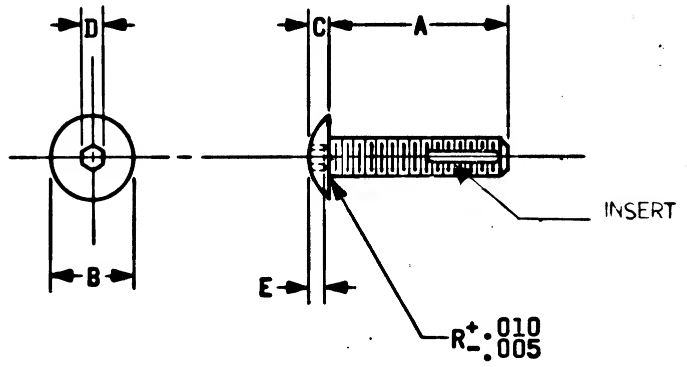
PART NO.	THREAD SIZE	A SEE NOTE 1	B DIM		C DIM		D DIM		E DIM
			MIN	MAX	MIN	MAX	MIN	MAX	MIN
1	2-56NC-3A	.187	.154	.164	.038	.046	.0500	.0510	0.028
2		.250							
3		.312							
4		.375							
5		.437							
6	↓	.500	↓	↓	↓	↓	↓	↓	↓
7									
8									
9									
10									
11									
12	4-40NC-3A	.187	.201	.213	.051	.059	.0625	.0635	0.035
13		.250							
14		.312							
15		.375							
16		.437							
17	↓	.500	↓	↓	↓	↓	↓	↓	↓
18									
19									
20									
21									
22									
23	6-32NC-3A	.187	.250	.262	.063	.073	.0781	.0791	0.044
24		.250							
25		.312							
26		.375							
27		.437							
28	↓	.500	↓	↓	↓	↓	↓	↓	↓
29	6-32UNC-3A	1.250	.250	.262	.063	.073	.0781	.0791	0.044

NOTE 1: TOLERANCE ON "A" DIMENSION

(A) 1.00 OR LESS = ±.016

(B) ABOVE 1.00 = $^{+.031}_{-.016}$

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

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MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS 9-497

DRAWN Janowiak DATE 18 JUNE 63
CHECKED Wilson 18 June 63
APPROVAL
APPROVAL E A Woodin 7-29-63
NASA APPROVAL W. J. Rhine 7-31-63
MIT APPROVAL 7/31/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCREW, BUTTON HEAD
SELF LOCKING, SOCKET HEX

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010618
SCALE NONE
WT
SHEET 1 OF 1

1010618 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

–	1010618

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A 02336	7/31/63	

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

SCREWS SHALL BE BURR FREE.

SCREWS SHALL MEET THE PERFORMANCE REQUIREMENTS AS OUTLINED IN MIL-F-18240.

PACKAGES SHALL BE MARKED WITH THE NASA DRAWING NO. DASH NO. AND REV. LETTER.

INSPECTION AND ACCEPTANCE:

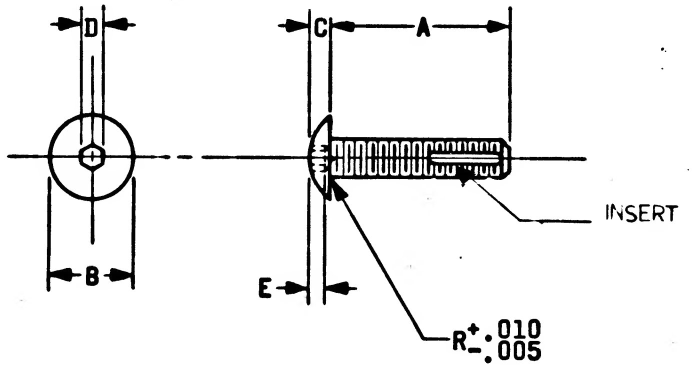
MATERIAL: 18-8 OR 16-18 CORROSION RESISTANT STEEL, PER QQ-S-763 OR PER FF-S-86 (75,000 PSI MIN. ULT. TEN. STR.)

FINISH: PASSIVATE PER MIL-F-14072,E300.

INSERT SHALL MEET THE REQUIREMENTS OUTLINED IN MIL-F-18240, TYPE B

THREADS SHALL BE IN ACCORDANCE WITH MIL-S-7742.

PART NO.	THREAD SIZE		B DIM		C DIM		D DIM		E DIM
		A±.015	MIN	MAX	MIN	MAX	MIN	MAX	MIN
1	2-56NC-3A	.187	.154	.164	.038	.046	.0500	.0510	0.028
2		.250							
3		.312							
4		.375							
5		.437							
6	↓	.500	↓	↓	↓	↓	↓	↓	↓
7									
8									
9									
10									
11									
12	4-40NC-3A	.187	.201	.213	.051	.059	.0625	.0635	0.035
13		.250							
14		.312							
15		.375							
16		.437							
17	↓	.500	↓	↓	↓	↓	↓	↓	↓
18									
19									
20									
21									
22									
23	6-32NC-3A	.187	.250	.262	.063	.073	.0781	.0791	0.044
24		.250							
25		.312							
26		.375							
27		.437							
28	↓	.500	↓	↓	↓	↓	↓	↓	↓



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS9-497

DRAWN Janowiak DATE 18 JUNE 63
CHECKED Wilson 18 June 63
APPROVAL
APPROVAL E.A.Woodin 7-29-63
NASA APPROVAL W.J. Rhine 7-31-63
MIT APPROVAL R.Hagel 7/31/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCREW, BUTTON HEAD
SELF LOCKING, SOCKET HEX

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010618
SCALE NONE
WT
SHEET 1 OF 1

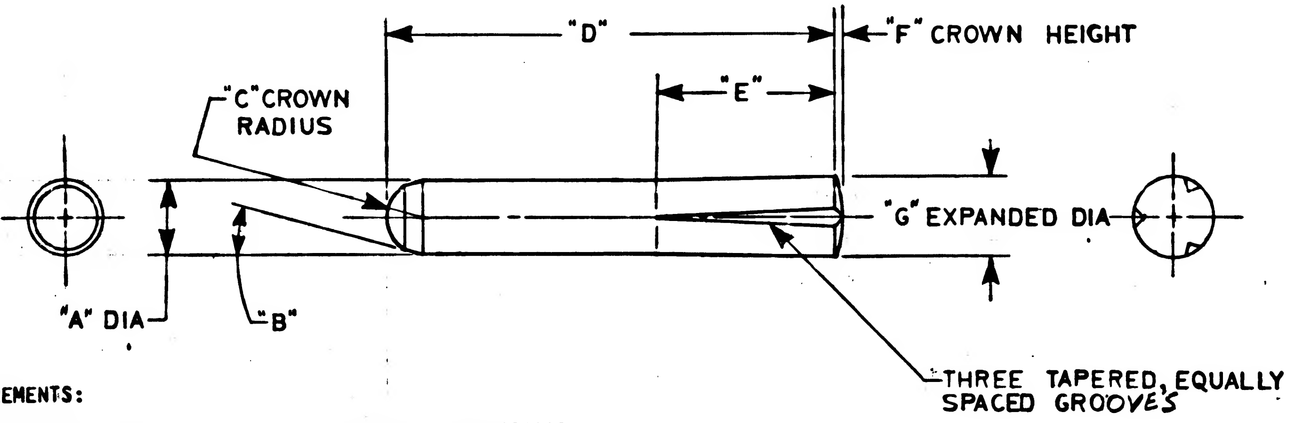
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010620 A

REVISIONS TDRR 01664

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02856	8/28/63	



1. GENERAL REQUIREMENTS:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. PARTS SHALL MEET THE QUALITY ASSURANCE REQUIREMENTS OF ND 1015404 CLASS 3.
2. INSPECTION & ACCEPTANCE:
   - A. PARTS SHALL BE PACKAGED IN ACCORDANCE WITH MANUFACTURERS BEST COMMERCIAL PRACTICE.
   - B. PACKAGES SHALL BE MARKED PER MIL-STD-130 WITH MANUFACTURER'S NAME OR SYMBOL, PART NUMBER, THE NASA DRAWING NUMBER AND REVISION LETTER.
   - C. DIMENSIONS AND TOLERANCES PER DRAWING
3. DESIGN REQUIREMENTS:
   - A. MATERIAL: STAINLESS STEEL PER QQ-S-763 CLASS 303 CONDITION A.
   - B. FINISH: PASSIVATE PER MIL-F-14072 #E300.

PART NUMBER	A	B	C	D	E	F	G
1010620-1	.0625 .0615	15°	.031	.390 .370	.150 .135	.0065	.067 .065
1010620-2	.1875 .1855	15°	.094	1.010 1.030	.532 .547	.018	.197 .193
1010620-3	.2500 .2480	15°	.125	1.310 1.330	.746 .726	.026	.262 .258

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT —
FINAL FINISH SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN DATE 14JUN63
CHECKED 6/11/63
APPROVAL 6/18/63
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PIN GUIDE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010620
SCALE NONE
WT
SHEET 1 OF 1

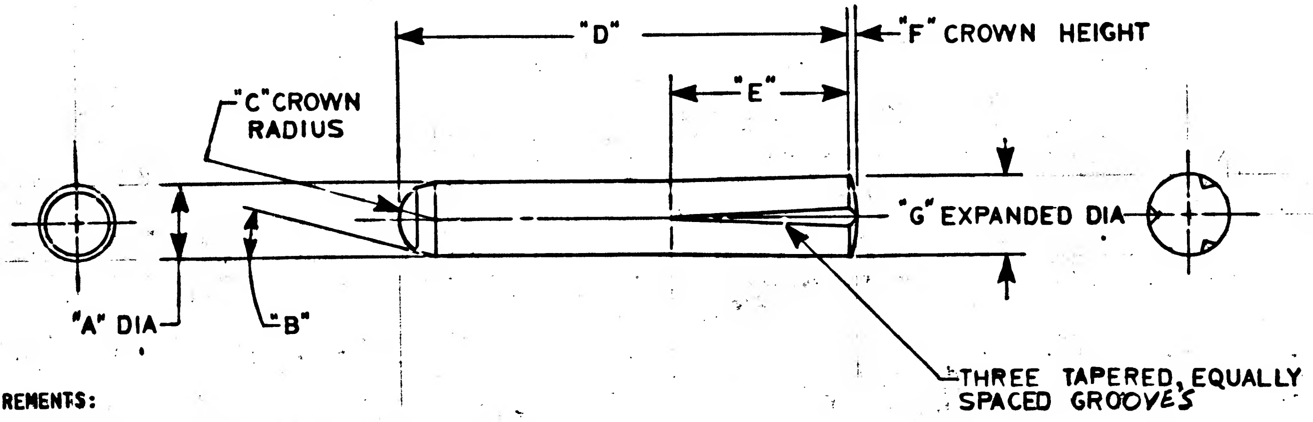
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010620 B

REVISIONS TDRR 01664

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 02856	8/28/63	
B	REVISED PER TDRR 07020	3/17/64	WK.



1. GENERAL REQUIREMENTS:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. PARTS SHALL MEET THE QUALITY ASSURANCE REQUIREMENTS OF ND 1015404 CLASS 3.
2. INSPECTION & ACCEPTANCE:
   - A. PARTS SHALL BE PACKAGED IN ACCORDANCE WITH MANUFACTURERS BEST COMMERCIAL PRACTICE.
   - B. PACKAGES SHALL BE MARKED PER ND1002019 WITH MANUFACTURER'S NAME OR SYMBOL, PART NUMBER, THE NASA DRAWING NUMBER, DASH NO. AND REVISION LETTER.
   - C. DIMENSIONS AND TOLERANCES PER DRAWING
3. DESIGN REQUIREMENTS:
   - A. MATERIAL: PER TABLE I.
   - B. FINISH: PASSIVATE PER MIL-F-14072 #E300.

TABLE I

PART NUMBER	A	B	C	D	E	F	G	MATERIAL
1010620-1	.0625 .0615	15°	.031	.390 .370	.150 .135	.0065	.067 .065	CRES QQ-S-763 CLASS 303 COND A
1010620-2	.1875 .1855	15°	.094	1.010 1.030	.532 .547	.018	.197 .193	
1010620-3	.2500 .2480	15°	.125	1.310 1.330	.746 .726	.026	.262 .258	
1010620-4	.0625 .0615	15°	.031	.390 .370	.150 .135	.0065	.067 .065	CRES QQ-S-763 TYPE 416 HEAT TREAT RC-39 MIL-H-6875
1010620-5	.1875 .1855	15°	.094	1.010 1.030	.532 .545	.018	.197 .193	
1010620-6	.2500 .2480	15°	.125	1.310 1.330	.746 .726	.026	.262 .258	

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT
—

FINAL FINISH
SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN DATE 4 JUN 63
CHECKED 6/1/63
APPROVAL D. R. 6/18/63
APPROVAL

NASA APPROVAL Jack Barnard
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PIN GUIDE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010620
SCALE NONE
WT
SHEET 1 OF 1

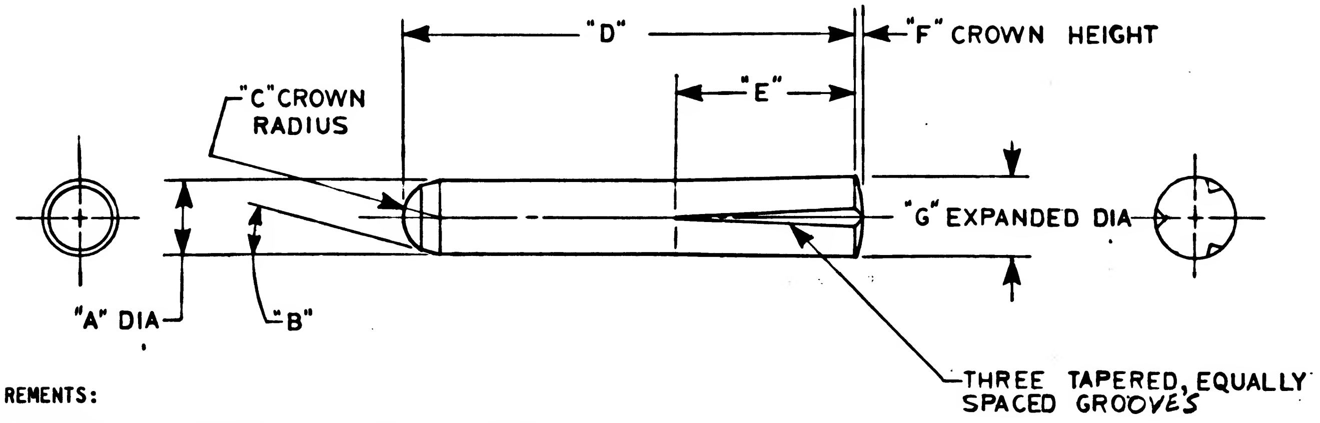
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010620

REVISIONS TDRR 01664

SYM	DESCRIPTION	DATE	APPROVAL



1. GENERAL REQUIREMENTS:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. PARTS SHALL MEET THE QUALITY ASSURANCE REQUIREMENTS OF ND 1015404 CLASS 3.
2. INSPECTION & ACCEPTANCE:
   - A. PARTS SHALL BE PACKAGED IN ACCORDANCE WITH MANUFACTURERS BEST COMMERCIAL PRACTICE.
   - B. PACKAGES SHALL BE MARKED PER MIL-STD-130 WITH MANUFACTURER'S NAME OR SYMBOL, PART NUMBER, THE NASA DRAWING NUMBER AND REVISION LETTER.
   - C. DIMENSIONS AND TOLERANCES PER DRAWING
3. DESIGN REQUIREMENTS:
   - A. MATERIAL: STAINLESS STEEL PER QQ-S-763 CLASS 303 CONDITION A.
   - B. FINISH: PASSIVATE PER MIL-F-14072 #E300.

PART NUMBER	A	B	C	D	E	F	G
1010620-1	.0635 .0625	15°	.031	.390 .370	.150 .165	.0065	.067 .065
1010620-2	.1875 .1855	15	.094	1.010 1.030	.532 .547	.018	.197 .193

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —//— DECIMALS ±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT //
FINAL FINISH SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN DATE 14JUN63
CHECKED 6/18/63
APPROVAL 6/18/63
APPROVAL
NASA APPROVAL
MIT APPROVAL

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HOUSTON, TEXAS

PIN GUIDE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010620
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010620

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1010621 A

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—			
A	REPLACED BY REV B WITH CHANGES PER TDRR 05976	1/25/64	EPK WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA DOCUMENT ND 1015404, CLASS 2.
   - C. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002052.
   - D. MARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-130 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, IDENTIFYING NUMBER, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.
   - E. CONTACTS TO BE SUPPLIED LOOSE WITH CONNECTOR, PER 1010464.
2. ACCEPTANCE AND INSPECTION:
   - A. DIMENSIONS PER DRAWING.
   - B. DIELECTRIC STRENGTH AT SEA LEVEL ATMOSPHERIC PRESSURE: 1500 VRMS PER METHOD 301 OF MIL-STD-202.
3. DESIGN REQUIREMENTS:
   - A. MECHANICAL PROPERTIES:
     - (1) MATERIAL: BODY-DIALLYL PHTHALATE PER MIL-M-19833, TYPE SDI-5 OR GDI-30 AS APPLICABLE.

       CONTACTS-1/2 HARD BRASS GOLD PLATED PER MIL-G-45204, TYPE 2, CLASS 1.

       HARDWARE - ALIGNMENT AND MOUNTING HARDWARE SHALL BE NON MAGNETIC CORROSION RESISTANT STEEL, PASSIVATED.
   - B. ELECTRICAL CHARACTERISTICS:
     - (1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM PER METHOD 302 OF MIL-STD-202.
     - (2) DIELECTRIC STRENGTH: AT 90,000 TO 130,000 FT: 250 VRMS PER METHOD 301 OF MIL-STD-202.
     - (3) CONTACT MATERIAL RESISTANCE: 0.003 OHMS, MAXIMUM. WHEN MATED IN PAIRS PER MIL-STD-202 METHOD 307.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 02086 DATE 7/1/76

A	A
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

REV (B) REPLACES REV (A) WITH CHANGES

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 21 June 63
CHECKED 17 July 63
APPROVAL 7/16/63
APPROVAL
NASA APPROVAL W J Rhine 7-17-63
MIT APPROVAL 7/17/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL,
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010621
SCALE NONE
WT
SHEET 1 OF 2

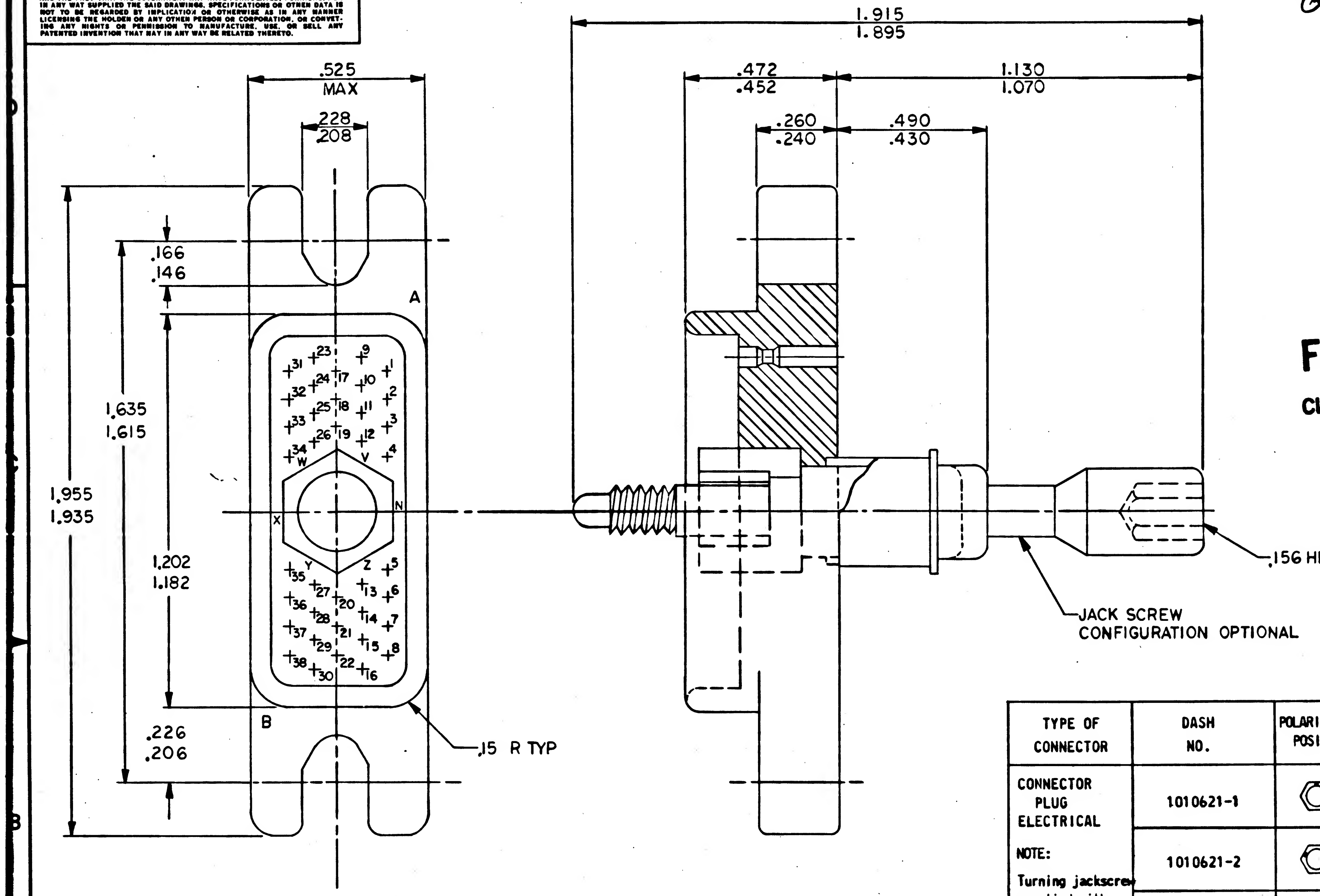
MASTER

1010621 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010621 A

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—			
A	REPLACED BY REV B WITH CHANGES PER TDRR 05976	1/15/64	EPK wk



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 02086 **DATE** 7/17/63

TYPE OF CONNECTOR	DASH NO.	POLARIZING POSITION
CONNECTOR PLUG ELECTRICAL	1010621-1	⬡
NOTE:	1010621-2	⬡
Turning jackscrew supplied with connector	1010621-3	⬡

REV Ⓐ REPLACED BY REV(B) WITH CHANGES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MASTER

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kane DATE 21 June, 63
CHECKED [illegible] 17 Jul 63
APPROVAL [illegible] 7/17/63
APPROVAL

NASA APPROVAL W. J. [illegible] 7-17-63

MIT APPROVAL [illegible] 7/17/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, PLUG, ELECTRICAL

SPECIFICATION CONTROL DRAWING

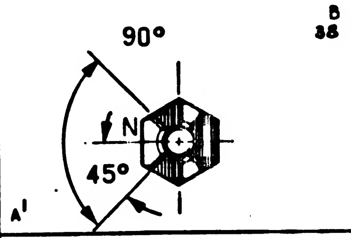
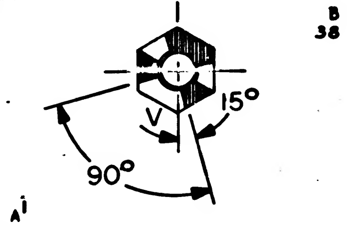
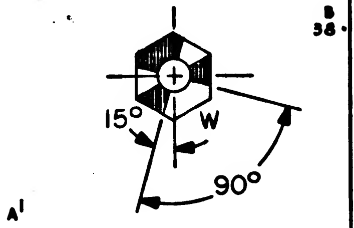
CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010621
SCALE NONE
WT
SHEET 2 OF 2

B | 1010621

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 02086 7-17-63

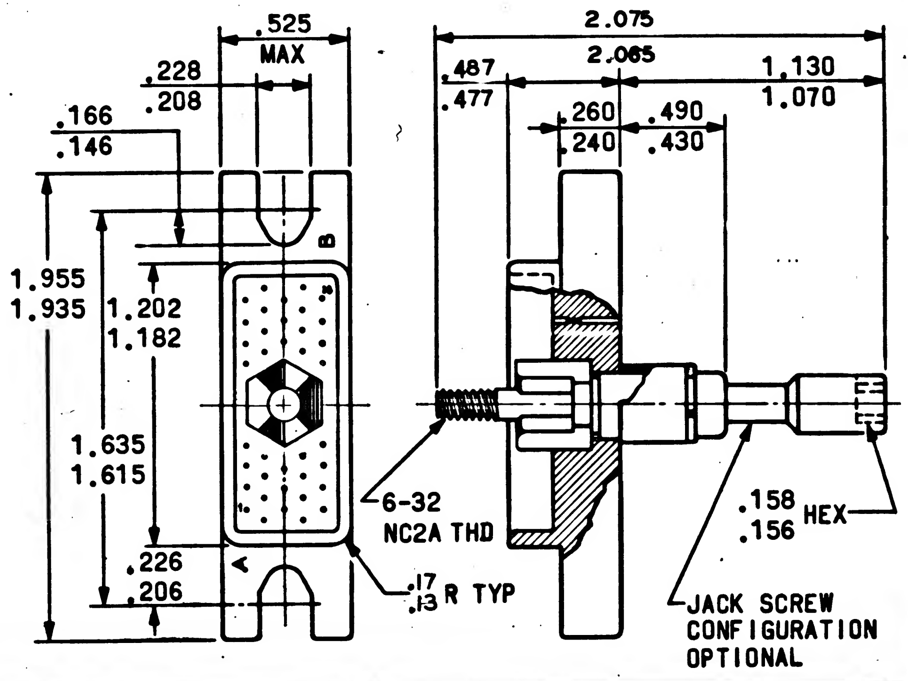
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 05976	1/28/64	RPK WK.

NASA PART NUMBER	POLARIZING CHART	NO. OF CONTACTS
1010621-1		38
1010621-2		38
1010621-3		38

MATES WITH 1010622

NOTES:

4. SHADED PORTION INDICATES HIGH POINTS ON HEX.
5. DIMENSIONAL OUTLINE DRAWING SHOWS "X" POLARIZATION.



B	B
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

Ⓑ REPLACES REV (A) WITH CHANGES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN Ronald L. Fox DATE 1 OCT 63
CHECKED M. MANNING 7 OCT 63
APPROVAL D. R. Test 28 Jan 64
APPROVAL
NASA APPROVAL 1/28/64
MIT APPROVAL 28 Jan 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - PLUG, ELECTRICAL
38
NO. 22 PIN CONTACTS
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010621
SCALE NONE
WT
SHEET 1 OF 2

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 02086 7-17-63

SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 05576	1/28/64	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002052.
   - D. PIN CONTACTS ARE TO BE PROCURED SEPARATELY PER 1010738-1
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL:
       - a. BODY: DIALLYPHTHALATE PER MIL-M-19833, TYPE SDI-5 OR GDI-30F AS APPLICABLE. (UNPIGMENTED)
       - b. HARDWARE:
         - POLARIZING BOSS: ALUMINUM ALLOY GRADE 7075T6 PER QQ-A-277-1
         - JACKSCREW AND METAL INSERT: CORROSION RESISTANT STEEL, CLASS 303, OR 303 SEE CONDITION A OR B PER MILITARY SPECIFICATION QQ-S-763.
         - SPACER: BRASS COMPOSITION 11 PER MILITARY SPECIFICATION QQ-B-626.
         - RETAINING RING: MS-16632-28 PER MILITARY SPECIFICATION MIL-R-21248.
       - c. FINISH:
         - HARDWARE:
           - POLARIZING BOSS: GRAY ANODIZE PER SPECIFICATION MIL-A-8625 CLASS 1.
           - JACKSCREW AND METAL INSERT: PASSIVATE PER MIL-F-14702 FINISH NO. E-300. JACKSCREW IS LUBRICATED PER SPECIFICATION MIL-L-25504.
           - SPACER: NICKEL PLATE PER QQ-N-290.
     - (2) FOR POLARIZATION SEE TABLE I
     - (3) DIMENSIONS: AS PER DRAWING
     - (4) MARKING:
       - a. PIECEMARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH ND1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, AND DATE CODE OR DATE OF MANUFACTURE. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART.
       - b. PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME
         - NASA PART NUMBER AND REVISION LETTER
         - SUPPLIER'S LOT OR SERIAL NUMBER
         - DATE CODE, OR DATE OF MANUFACTURE
       - c. MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.
3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL REQUIREMENTS WITH CONTACTS INSTALLED
     - (1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 150°F MEASURED BETWEEN ANY TWO ADJACENT CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY ADJACENT CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202 METHOD 302, CONDITION C.
     - (2) DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 600 VRMS. 90,000 TO 130,000 FT. - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 100 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301.
     - (3) VOLTAGE RATINGS:

	VOLTS DC	VOLTS AC RMS
SEA LEVEL	490	350
10,000 FT.	390	280
60,000 FT.	140	100

WITHSTANDING VOLTAGE (SEA LEVEL) 1500 VOLTS RMS 60 CPS WITHOUT FLASHOVER.

   - B. MECHANICAL
     - (1) CONTACT RETENTION FORCE

       WHEN CONTACTS ARE PROPERLY INSTALLED IN THEIR USING CONNECTOR, THEY ARE CAPABLE OF WITHSTANDING (WITHOUT DAMAGE) A MIN OF 15 LBS. AXIAL LOAD APPLIED IN EITHER DIRECTION AT A RATE OF 1 POUND PER SECOND.

Ⓑ REPLACES REV (A) WITH CHANGES

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: SEE REQUIREMENTS

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN Ronald L. Fox DATE 1 OCT 63
CHECKED M. MANNING 7 OCT 63
APPROVAL 28 JAN 64
APPROVAL
NASA APPROVAL 1/28/64
MIT APPROVAL W Kupfer 28 Jan 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - PLUG ELECTRICAL
38
FOR NO. 22 PIN CONTACTS
SPECIFICATION CONTROL DRAWING

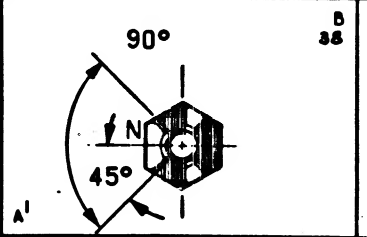
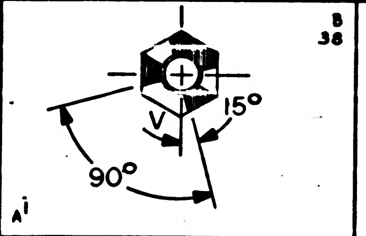
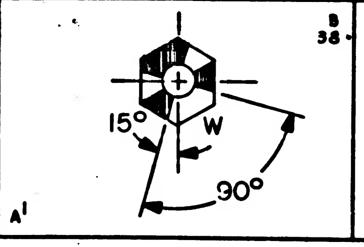
CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010621
SCALE NONE
WT
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010621 C

REVISIONS TDRR 02086 7-17-63			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 05976	1/25/64	RPK WK
C	REVISED PER TDRR 06529	4/10/64	RPK WK

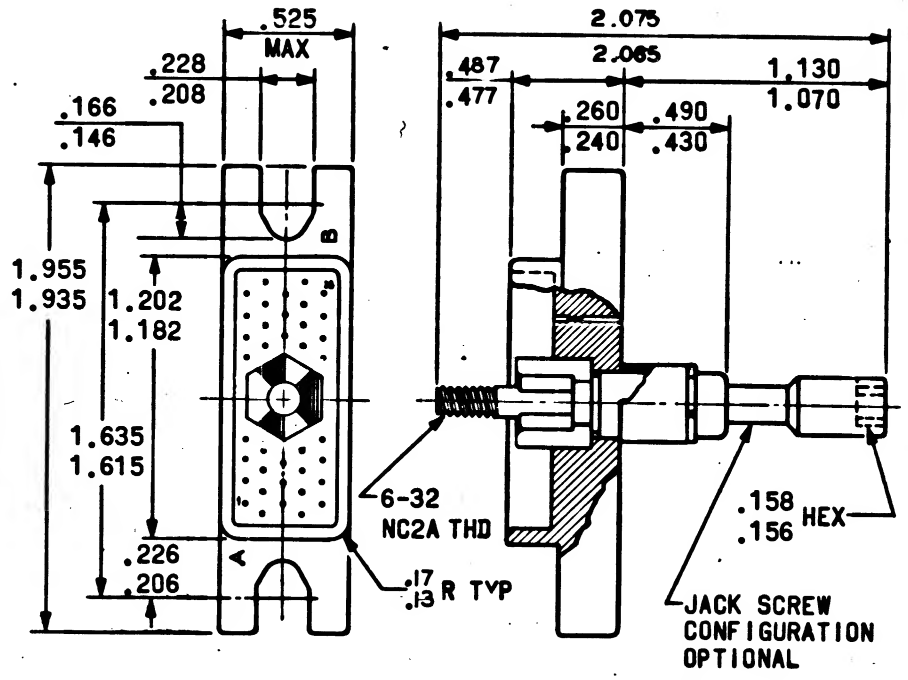
Ⓜ

NASA PART NUMBER	POLARIZING CHART	NO. OF CONTACTS
1010621-1		38
1010621-2		38
1010621-3		38

MATES WITH 1010622

NOTES:

4. SHADED PORTION INDICATES HIGH POINTS ON HEX.
5. DIMENSIONAL OUTLINE DRAWING SHOWS "N" POLARIZATION.



C	C
B	B
SHEET 1	SHEET 2

REVISION STATUS OF SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

Ⓑ REPLACES REV (A) WITH CHANGES

MASTER

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
SEE REQUIREMENTS
HEAT TREATMENT
NONE
FINAL FINISH
SEE REQUIREMENTS

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CONTRACT NAS 9-497

DRAWN Ronald L. Fox DATE 1 OCT 63
CHECKED M. MANNING 7 OCT 63
APPROVAL D. R. Test 28 JAN 64
APPROVAL
NASA APPROVAL W. D. Swingle 1/28/64
MIT APPROVAL W. Kupfer 28 Jan 64

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CONNECTOR - PLUG, ELECTRICAL
38
NO. 22 PIN CONTACTS

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1010621

SCALE NONE | WT | SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS TDRR 02086 7-17-63

SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 05976	1/28/64	WK
C	REVISED PER TDRR 06529	1/28/64	WK

REQUIREMENTS:

1. GENERAL:
   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327

   B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002052.
   D. CONNECTORS ARE DESIGNED TO USE PIN CONTACTS PER 1010738-1

2. INSPECTION AND ACCEPTANCE:
   A. MECHANICAL REQUIREMENTS:
      (1) MATERIAL:
         a. BODY: DIALLYPHTHALATE PER MIL-M-19833, TYPE SDI-5 OR GDI-30F AS APPLICABLE. (UNPIGMENTED)
         b. HARDWARE:
            POLARIZING BOSS: ALUMINUM ALLOY GRADE 7075T6 PER QQ-A-277-1
            JACKSCREW AND METAL INSERT: CORROSION RESISTANT STEEL, CLASS 303, OR 303 SEE CONDITION A OR B PER MILITARY SPECIFICATION QQ-S-763.
            SPACER: BRASS COMPOSITION 11 PER MILITARY SPECIFICATION QQ-B-626.
            RETAINING RING: MS-16632-28 PER MILITARY SPECIFICATION MIL-R-21248.
         c. FINISH:
            HARDWARE:
               POLARIZING BOSS: GRAY ANODIZE PER SPECIFICATION MIL-A-8625 CLASS 1.
               JACKSCREW AND METAL INSERT: PASSIVATE PER MIL-F-14072 FINISH NO. E-300. JACKSCREW IS LUBRICATED PER SPECIFICATION MIL-L-25504.
               SPACER: NICKEL PLATE PER QQ-N-290.
      (2) FOR POLARIZATION SEE TABLE I
      (3) DIMENSIONS: AS PER DRAWING
      (4) MARKING:
         a. PIECEMARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH ND 1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, AND DATE CODE OR DATE OF MANUFACTURE. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART.
         b. PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
            SUPPLIER'S NAME
            NASA PART NUMBER AND REVISION LETTER
            SUPPLIER'S LOT OR SERIAL NUMBER
            DATE CODE, OR DATE OF MANUFACTURE
         c. MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

3. DESIGN REQUIREMENTS:
   A. ELECTRICAL REQUIREMENTS WITH CONTACTS INSTALLED
      (1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 150°F MEASURED BETWEEN ANY TWO ADJACENT CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY ADJACENT CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202 METHOD 302, CONDITION C.
      (2) DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 600 VRMS. 90,000 TO 130,000 FT. - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 100 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301.
      (3) VOLTAGE RATINGS:

	VOLTS DC	VOLTS AC RMS
SEA LEVEL	490	350
10,000 FT.	390	280
60,000 FT.	140	100

      WITHSTANDING VOLTAGE (SEA LEVEL) 1500 VOLTS RMS 60 CPS WITHOUT FLASHOVER.
   B. MECHANICAL
      (1) CONTACT RETENTION FORCE
      WHEN CONTACTS ARE PROPERLY INSTALLED IN THEIR USING CONNECTOR, THEY ARE CAPABLE OF WITHSTANDING (WITHOUT DAMAGE) A MIN OF 15 LBS. AXIAL LOAD APPLIED IN EITHER DIRECTION AT A RATE OF 1 POUND PER SECOND.

Ⓑ REPLACES REV (A) WITH CHANGES

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: SEE REQUIREMENTS

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CONTRACT NAS 9-497

DRAWN DATE 1 OCT 63
CHECKED M. MANNING 2 OCT 63
APPROVAL 28 JAN 64
APPROVAL
NASA APPROVAL 1/28/64
MIT APPROVAL W Kupfer 28 Jan 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - PLUG ELECTRICAL
38
FOR NO. 22 PIN CONTACTS
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010621
SCALE NONE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

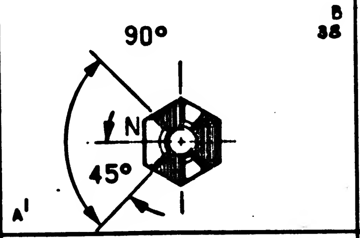
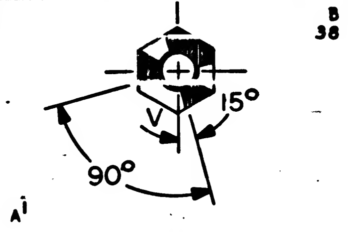
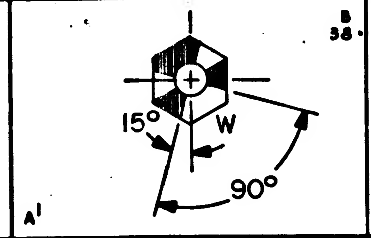
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

D 1010621

REVISIONS TDRR 02086 7-17-63

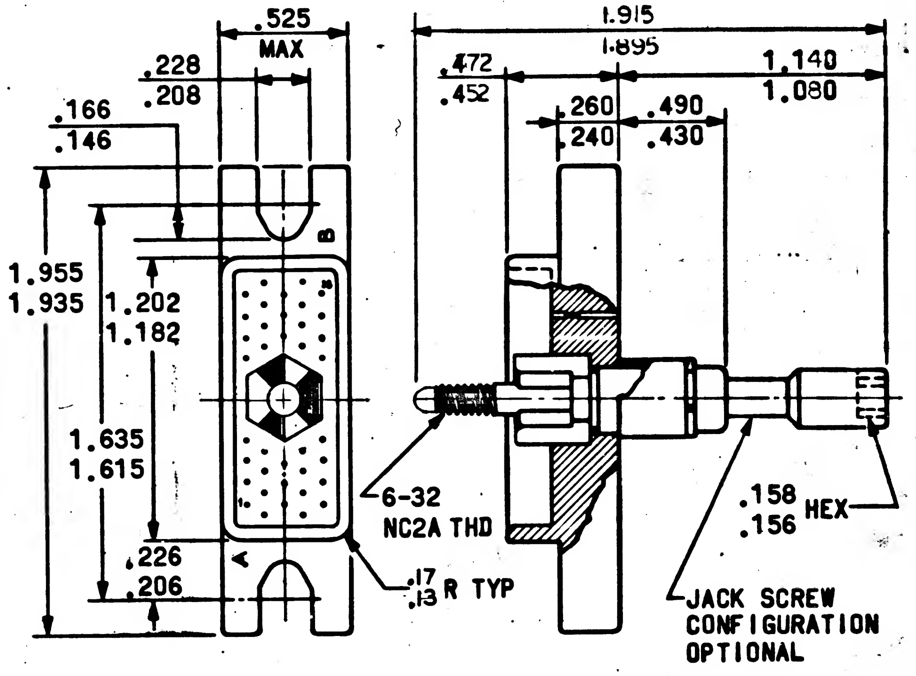
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 05976	1/28/64	RPK WK.
C	REVISED PER TDRR 06529	2/18/64	RPK WK
D	REVISED PER TDRR 07111	3/24/64	RPK WK.

M
M

NASA PART NUMBER	POLARIZING CHART	NO. OF CONTACTS
1010621-1		38
1010621-2		38
1010621-3		38

MATES WITH 1010622

NOTES:
4. SHADED PORTION INDICATES HIGH POINTS ON HEX.
5. DIMENSIONAL OUTLINE DRAWING SHOWS "N" POLARIZATION.



D	C
C	C
B	B
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

Ⓑ REPLACES REV (A) WITH CHANGES

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
SEE REQUIREMENTS
HEAT TREATMENT
NONE
FINAL FINISH
SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT NAS 9-497
DRAWN Ronald L. Fox DATE 1 OCT 63
CHECKED M. MANNING 7 OCT 63
APPROVAL D.R. Test 28 Jan 64
APPROVAL
NASA APPROVAL 1/28/64
MIT APPROVAL 28 Jan 64

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HOUSTON, TEXAS

CONNECTOR - PLUG, ELECTRICAL
38
NO. 22 PIN CONTACTS
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010621
SCALE NONE
WT
SHEET 1 OF 2

1010621

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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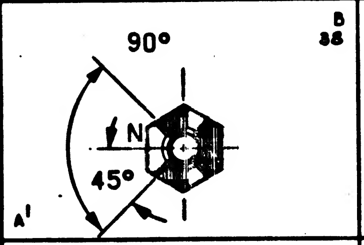
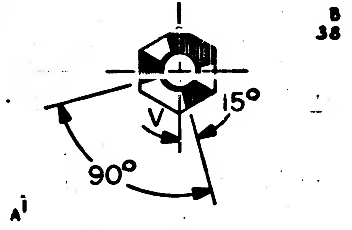
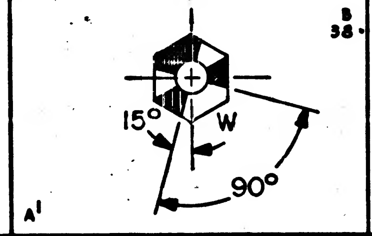
1010621 E

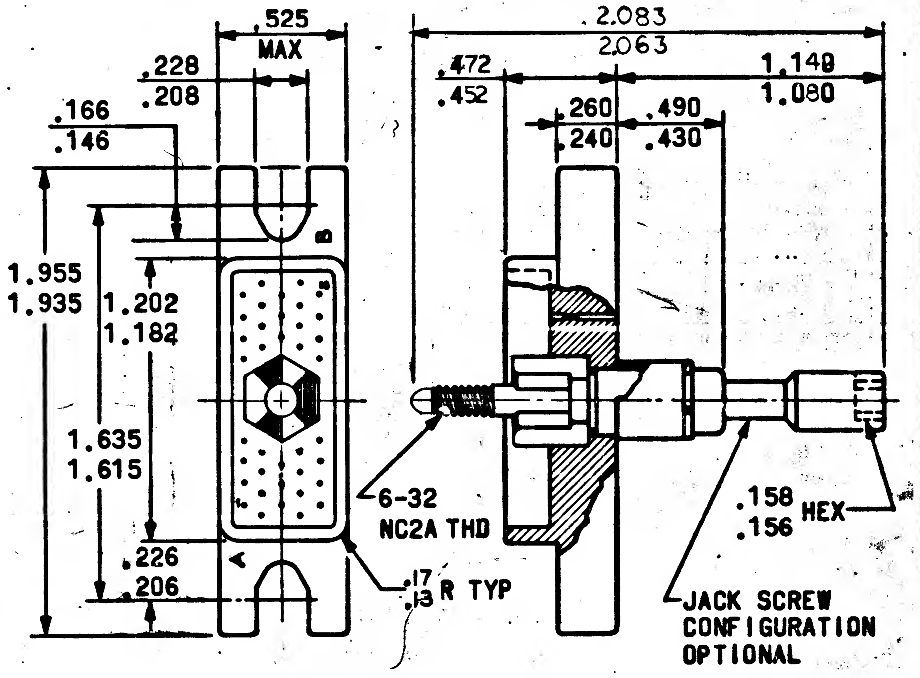
REVISIONS TDRR 02086 7-17-63			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 05976	1/25/64	RPK WK.
C	REVISED PER TDRR 06529	4/18/64	RPK WK
D	REVISED PER TDRR 07144	3/24/64	RPK WK.
E	REVISED PER TDRR 08077	5 May 64	WK.

NASA PART NUMBER	POLARIZING CHART	NO. OF CONTACTS
1010621-1		38
1010621-2		38
1010621-3		38

MATES WITH 1010622

NOTES:

4. SHADED PORTION INDICATES HIGH POINTS ON HEX.
5. DIMENSIONAL OUTLINE DRAWING SHOWS "N" POLARIZATION.



E	C
D	C
C	C
B	B
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

Ⓑ REPLACES REV (A) WITH CHANGES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN [illegible] DATE 1 OCT 63
CHECKED M. MANNING 7 OCT 63
APPROVAL [illegible] 28 Jan 64
APPROVAL
NASA APPROVAL [illegible] 1/2/64
MIT APPROVAL [illegible] 28 Jan 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - PLUG, ELECTRICAL
38
NO. 22 PIN CONTACTS

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010621
SCALE NONE
WT
SHEET 1 OF 2

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010621

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—			

REQUIREMENTS:

1. GENERAL:

   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

   B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA DOCUMENT ND 1015404, CLASS 2.

   C. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002052.

   D. MARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-130 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, IDENTIFYING NUMBER, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

   E. CONTACTS TO BE SUPPLIED LOOSE WITH CONNECTOR, PER 1010464.

2. ACCEPTANCE AND INSPECTION:

   A. DIMENSIONS PER DRAWING.

   B. DIELECTRIC STRENGTH AT SEA LEVEL ATMOSPHERIC PRESSURE: 1500 VRMS PER METHOD 301 OF MIL-STD-202.

3. DESIGN REQUIREMENTS:

   A. MECHANICAL PROPERTIES:

      (1) MATERIAL: BODY-DIALLYL PHTHALATE PER MIL-M-19833, TYPE SDI-5 OR GDI-30 AS APPLICABLE.

      CONTACTS-1/2 HARD BRASS GOLD PLATED PER MIL-G-45204, TYPE 2, CLASS 1.

      HARDWARE - ALIGNMENT AND MOUNTING HARDWARE SHALL BE NON MAGNETIC CORROSION RESISTANT STEEL, PASSIVATED.

   B. ELECTRICAL CHARACTERISTICS:

      (1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM PER METHOD 302 OF MIL-STD-202.

      (2) DIELECTRIC STRENGTH: AT 90,000 TO 130,000 FT: 250 VRMS PER METHOD 301 OF MIL-STD-202.

      (3) CONTACT MATERIAL RESISTANCE: 0.003 OHMS, MAXIMUM. WHEN MATED IN PAIRS PER MIL-STD-202 METHOD 307.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 02086 **DATE** 7/17/6

—	—
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
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DRAWN R. Kane DATE 21 June 63
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NASA APPROVAL W. J. Rhine 7-17-63
MIT APPROVAL 7/17/63

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CONNECTOR, PLUG, ELECTRICAL
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010621
SCALE NONE WT SHEET 1 OF 2

MASTER

1010621

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010621

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—			

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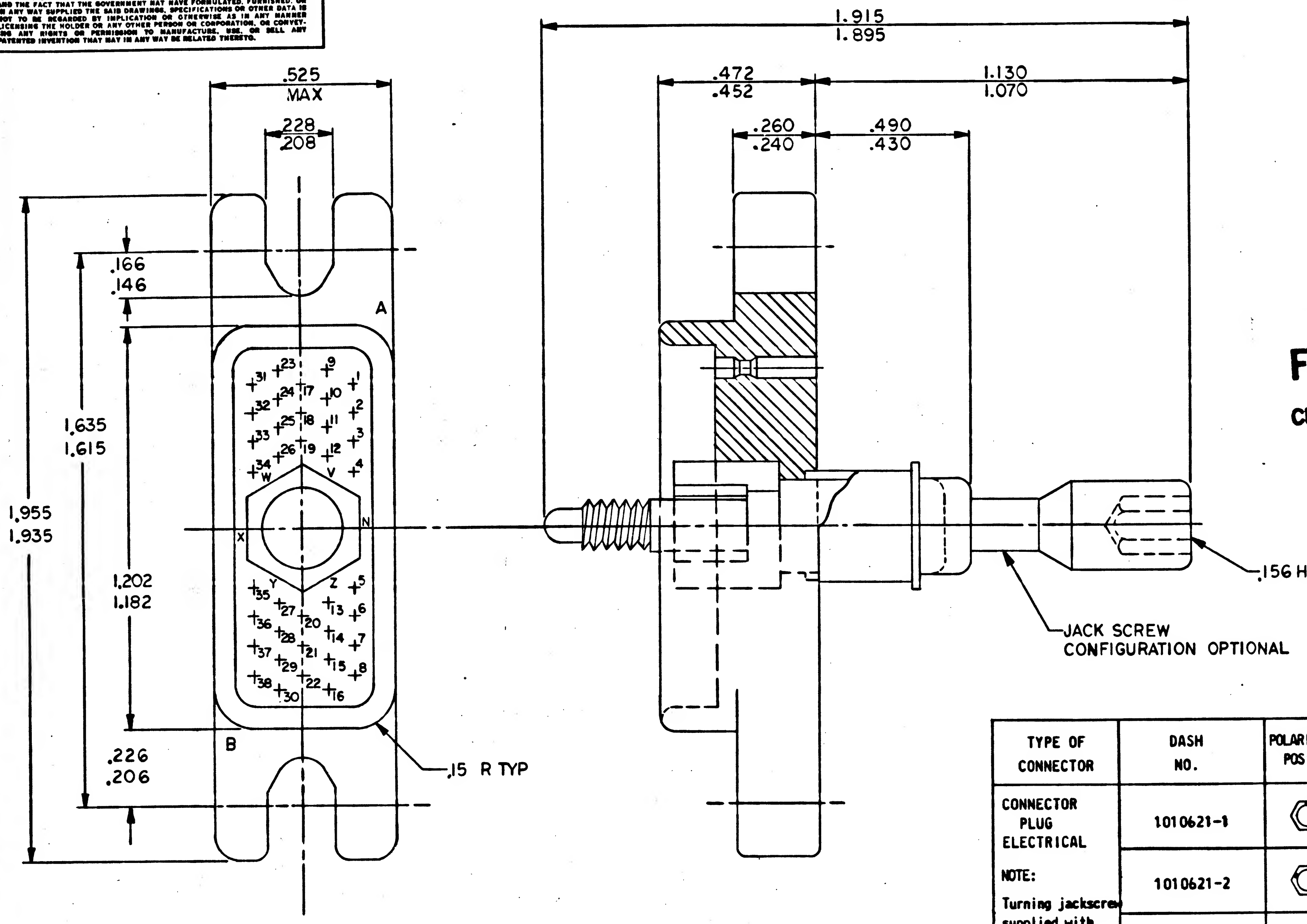

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 02086 DATE 7/17/63

TYPE OF CONNECTOR	DASH NO.	POLARIZING POSITION
CONNECTOR PLUG ELECTRICAL	1010621-1	⬡
NOTE: Turning jackscrew supplied with connector	1010621-2	⬡
	1010621-3	⬡

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

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DWG. NO. CONTRACT
DRAWN R. Kane DATE 21 June 63
CHECKED 17 Jul 63
APPROVAL 7/17/63
APPROVAL
NASA APPROVAL W. J. 7-17-63
MIT APPROVAL 7/17/63

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CONNECTOR, PLUG, ELECTRICAL

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010621
SCALE NONE
WT
SHEET 2 OF 2

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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1010622 A

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REPLACED BY REV B WITH CHANGES PER TDRR 05576	1/25/64	epk WK

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA DOCUMENT ND 1015404, CLASS 2.

C. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002052.

D. MARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-130 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, IDENTIFYING NUMBER, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

E. CONTACTS TO BE SUPPLIED LOOSE WITH CONNECTOR, PER 1010464

2. ACCEPTANCE AND INSPECTION:

A. DIMENSIONS PER DRAWING.

B. DIELECTRIC STRENGTH AT SEA LEVEL ATMOSPHERIC PRESSURE: 1500 VRMS PER METHOD 301 OF MIL-STD-202.

3. DESIGN REQUIREMENTS:

A. MECHANICAL PROPERTIES:

(1) MATERIAL: BODY-DIALLYL PHTHALATE PER MIL-M-19833, TYPE SDI-5 OR GDI-30 AS APPLICABLE.

CONTACTS-1/2 HARD BRASS GOLD PLATED PER MIL-G-45204, TYPE 2, CLASS 1.

HARDWARE - ALIGNMENT AND MOUNTING HARDWARE SHALL BE NON MAGNETIC CORROSION RESISTANT STEEL, PASSIVATED.

B. ELECTRICAL CHARACTERISTICS:

(1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM PER METHOD 302 OF MIL-STD-202.

(2) DIELECTRIC STRENGTH: AT 90,000 TO 130,000 FT: 250 VRMS PER METHOD 301 OF MIL-STD-202.

(3) CONTACT MATERIAL RESISTANCE: 0.003 OHMS, MAXIMUM. WHEN MATED IN PAIRS PER MIL-STD-202 METHOD 307.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 02086 DATE 7/17/63

A	A
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

REV (A) REPLACED BY REV (B) WITH CHANGES

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
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DRAWN R. Kane DATE 24 June 63
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APPROVAL 7/17/63
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NASA APPROVAL W. J. Rhine 7-17-63
MIT APPROVAL 7/17/63

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CONNECTOR, RECEPTACLE, ELECTRICAL
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010622
SCALE NONE
WT
SHEET 1 OF 2

MASTER

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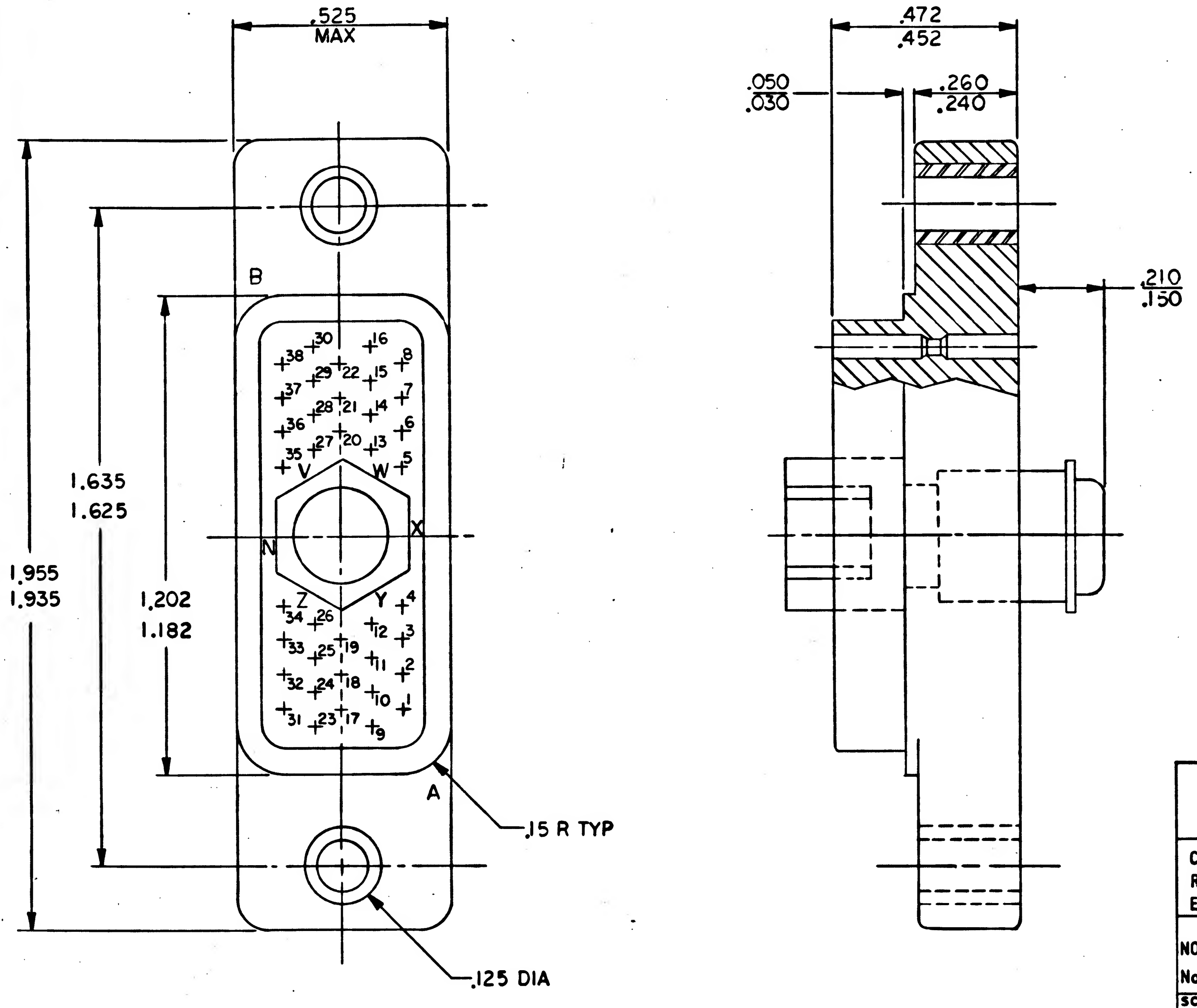
1010622 A

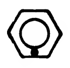
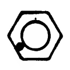
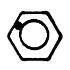
REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
A	REPLACED BY REV B WITH CHANGES PER TDRR 05975	1/25/64	EPE WR



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 02086 DATE 7/17/63

TYPE OF CONNECTOR	NASA DRAWING NUMBER	POLARIZING POSITION
CONNECTOR RECEPTACLE ELECTRICAL	1010622-1	
NOTE: No turning jack screw supplied with connector	1010622-2	
	1010622-3	

REV (A) REPLACED BY REV (B) WITH CHANGES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING
MATERIAL
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DWG. NO.
CONTRACT

DRAWN R. Kane DATE 24 June 63
CHECKED 25 June 63
APPROVAL 7/17/63
APPROVAL
NASA APPROVAL W. J. 7-17-63
MIT APPROVAL 7/17/63

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CONNECTOR, RECEPTACLE, ELECTRICAL

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010622
SCALE NONE
WT
SHEET 2 OF 2

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

B 1010622

REVISIONS 02086 7-17-63			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 05975	1/28/64	WK.

REQUIREMENTS:

1. GENERAL:
   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327
   B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002052.
   D. SOCKET CONTACTS ARE TO BE PROCURED SEPARATELY PER 1010738-2

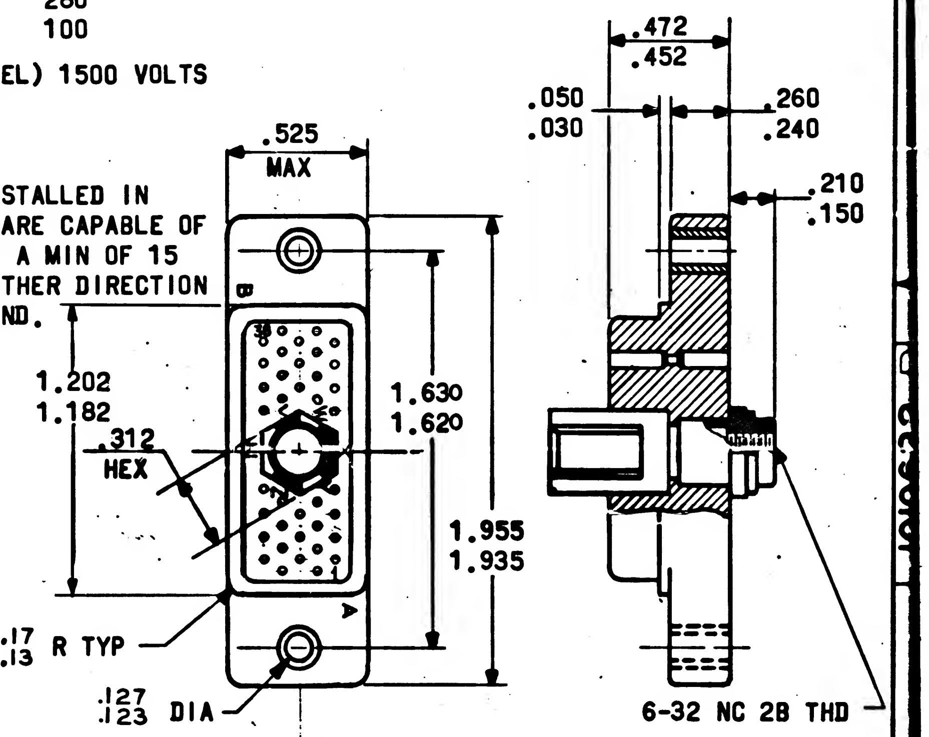
2. INSPECTION AND ACCEPTANCE:
   A. MECHANICAL REQUIREMENTS:
      (1) MATERIAL:
         (a) BODY: DIALLYPHTHALATE PER MIL-M-19833, TYPE SDI-5 OR GDI-30F AS APPLICABLE. (UNPIGMENTED)
         (b) HARDWARE:
            POLARIZING BOSS: ALUMINUM ALLOY GRADE 7075T6 PER QQ-A-277-1
            METAL INSERT: CORROSION RESISTANT STEEL, CLASS 303, OR 303 SEE CONDITION A OR B PER MILITARY SPECIFICATION QQ-S-763.
            SPACER: BRASS COMPOSITION 11 PER MILITARY SPECIFICATION QQ-B-626.
            RETAINING RING: MS-16632-28 PER MILITARY SPECIFICATION MIL-R-21248.
         (c) FINISH:
            HARDWARE:
               POLARIZING BOSS: GRAY ANODIZE PER SPECIFICATION MIL-A-8625 CLASS 1.
               METAL INSERT: PASSIVATE PER MIL-F-14702 FINISH NO. E-300.
               SPACER: NICKEL PLATE PER QQ-N-290.
         (d) FOR POLARIZATION SEE TABLE I
         (e) DIMENSIONS: AS PER DRAWING
         (f) MARKING:
            PIECEMARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH ND1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, AND DATE CODE OR DATE OF MANUFACTURE. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART.
            PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
               SUPPLIER'S NAME
               NASA PART NUMBER AND REVISION LETTER
               SUPPLIER'S LOT OR SERIAL NUMBER
               DATE CODE, OR DATE OF MANUFACTURE
            MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

3. DESIGN REQUIREMENTS:
   A. ELECTRICAL REQUIREMENTS WITH CONTACTS INSTALLED
      (1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 150°F MEASURED BETWEEN ANY TWO ADJACENT CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY ADJACENT CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202 METHOD 302, CONDITION C.
      (2) DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 600 VRMS. 90,000 TO 130,000 FT. - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 100 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301.
      (3) VOLTAGE RATINGS:

	VOLTS DC	VOLTS AC RMS
SEA LEVEL	490	350
10,000 FT.	390	280
60,000 FT.	140	100

WITHSTANDING VOLTAGE (SEA LEVEL) 1500 VOLTS RMS 60 CPS WITHOUT FLASHOVER.

   B. MECHANICAL
      (1) CONTACT RETENTION FORCE
         WHEN CONTACTS ARE PROPERLY INSTALLED IN THEIR USING CONNECTOR, THEY ARE CAPABLE OF WITHSTANDING (WITHOUT DAMAGE) A MIN OF 15 LBS. AXIAL LOAD APPLIED IN EITHER DIRECTION AT A RATE OF 1 POUND PER SECOND.



Ⓑ REPLACES REV(A) WITH CHANGES

—	—
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

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MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
NONE

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DWG. NO. CONTRACT

DRAWN R.W. Turner DATE 3 OCT 63
CHECKED M. MANNING 7 OCT 63
APPROVAL D. R. Test 28 JAN 64
APPROVAL
NASA APPROVAL 1/28/64
MIT APPROVAL W Kupfer 28 Jan 64

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CONNECTOR - RECEPTACLE, ELECTRICAL
38
NO. 22 SOCKET CONTACTS
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010622
SCALE NONE
WT
SHEET 1 OF 2

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

B 1010622

REVISIONS 02086 7-17-63			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 05975	1/28/64	WK

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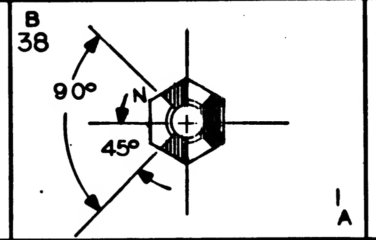
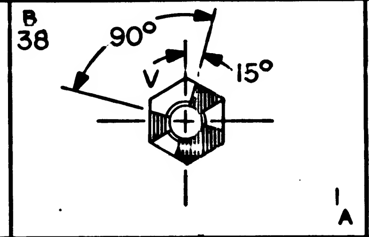
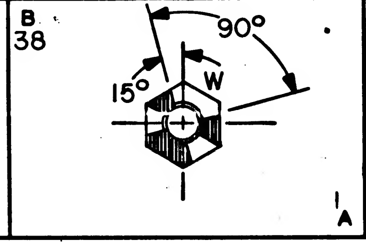
NASA PART NUMBER	POLARIZING CHART	NO. OF CONTACTS
1010622-1		38
1010622-2		38
1010622-3		38

MATES WITH 1010621

NOTES:

4. SHADED PORTION INDICATES HIGH POINTS ON HEX.
5. DIMENSIONAL OUTLINE DRAWING SHOWS "X" POLARIZATION.

Ⓑ REPLACES REV (A) WITH CHANGES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON
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CONTRACT NAS9-497
DRAWN R.W. Turner DATE 3 OCT 63
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APPROVAL D.B. Fist 28 JAN 64
APPROVAL
NASA APPROVAL 1/28/64
MIT APPROVAL W. Kupfer 28 Jan 64

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HOUSTON, TEXAS

CONNECTOR - RECEPTACLE, ELECTRICAL
38
. NO. 22 SOCKET CONTACTS
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1010622
SCALE | WT | SHEET 2 OF 2

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1010622

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS			

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA DOCUMENT ND 1015404, CLASS 2.
   - C. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002052.
   - D. MARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-130 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, IDENTIFYING NUMBER, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.
   - E. CONTACTS TO BE SUPPLIED LOOSE WITH CONNECTOR, PER 1010464
2. ACCEPTANCE AND INSPECTION:
   - A. DIMENSIONS PER DRAWING.
   - B. DIELECTRIC STRENGTH AT SEA LEVEL ATMOSPHERIC PRESSURE: 1500 VRMS PER METHOD 301 OF MIL-STD-202.
3. DESIGN REQUIREMENTS:
   - A. MECHANICAL PROPERTIES:
     - (1) MATERIAL: BODY-DIALLYL PHTHALATE PER MIL-M-19833, TYPE SDI-5 OR GDI-30 AS APPLICABLE.

       CONTACTS-1/2 HARD BRASS GOLD PLATED PER MIL-G-45204, TYPE 2, CLASS 1.

       HARDWARE - ALIGNMENT AND MOUNTING HARDWARE SHALL BE NON MAGNETIC CORROSION RESISTANT STEEL, PASSIVATED.
   - B. ELECTRICAL CHARACTERISTICS:
     - (1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM PER METHOD 302 OF MIL-STD-202.
     - (2) DIELECTRIC STRENGTH: AT 90,000 TO 130,000 FT: 250 VRMS PER METHOD 301 OF MIL-STD-202.
     - (3) CONTACT MATERIAL RESISTANCE: 0.003 OHMS, MAXIMUM. WHEN MATED IN PAIRS PER MIL-STD-202 METHOD 307.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 02086 DATE 7/17/63

SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

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DRAWN R. Kane DATE 24 June 63
CHECKED 26 Jul 63
APPROVAL 7/17/63
APPROVAL
NASA APPROVAL W J 7-17-63
MIT APPROVAL 7/17/63

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HOUSTON, TEXAS

CONNECTOR, RECEPTACLE, ELECTRICAL

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010622
SCALE NONE
WT
SHEET 1 OF 2

MASTER

INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

1010622

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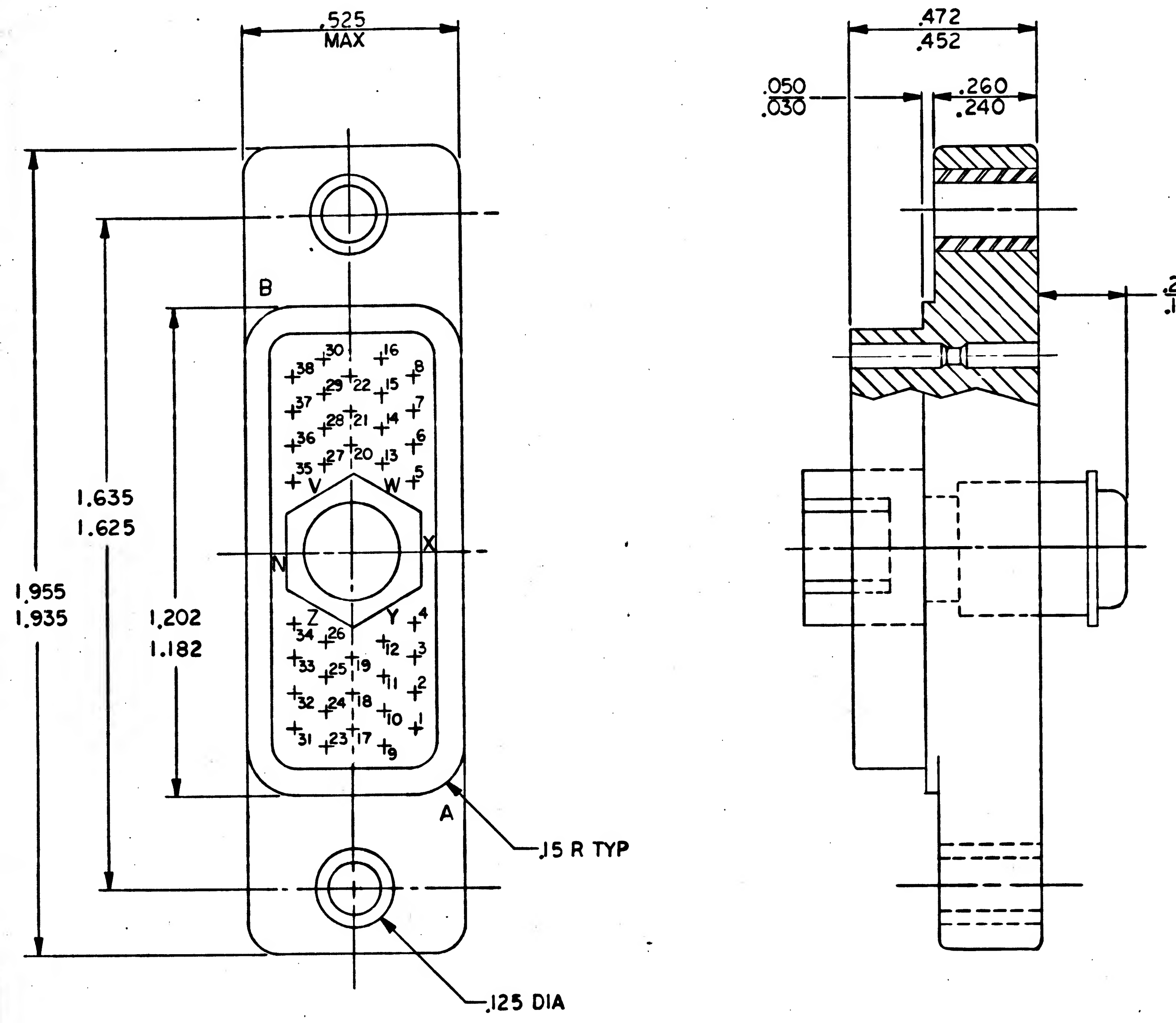
1010622

SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 02056 DATE 7/17/6

TYPE OF CONNECTOR	NASA DRAWING NUMBER	POLARIZING POSITION
CONNECTOR RECEPTACLE ELECTRICAL	1010622-1	⬡
NOTE: No turning jack-screw supplied with connector	1010622-2	⬡
	1010622-3	⬡

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

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CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 24 June 63
CHECKED 25 June 63
APPROVAL 7/17/63
APPROVAL
NASA APPROVAL W. J. White 7-17-63
MIT APPROVAL L. Hazel 7/17/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR, RECEPTACLE, ELECTRICAL

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010622
SCALE NONE
WT
SHEET 2 OF 2

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010623 A

REVISIONS 02471			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A	7Aug63	WR
A	REVISED PER TDRR 04213	24Oct63	WR

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404 CLASS 3.

C. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-T-55155.

2. INSPECTION AND ACCEPTANCE:

A. MECHANICAL REQUIREMENTS

(1) DIMENSIONS PER DRAWING

B. MARKING:

(1) UNIT PACKAGES SHALL BE MARKED PER MIL-STD-129 WITH THE MANUFACTURER'S NAME OR SYMBOL, PART NUMBER AND THE NASA DRAWING NUMBER AND REVISION LETTER.

C. PACKAGING AND PACKING:

(1) UNITS SHALL BE PACKAGED IN ACCORDANCE WITH MANUFACTURER'S BEST COMMERCIAL PRACTICE.

3. DESIGN REQUIREMENTS:

A. MATERIAL:

(1) TERMINAL: BRASS, PER QQ-B-626, COMPOSITION 22, 1/2 HARD, SOLDER FINISH PER MIL-F-14072, TYPE M222.

(2) INSULATION: POLYTETRAFLUOROETHYLENE PER MIL-M-14077 OR MIL-P-19468.

B. ELECTRICAL RATING:

(1) NOMINAL VOLTAGE RATING: 1000 VRMS

(2) FLASHOVER VOLTAGE AT SEA LEVEL: 3000 VRMS

(3) CAPACITANCE: PER TABLE 1

(4) DIELECTRIC WITHSTANDING VOLTAGE (SEA LEVEL): 1500 VOLTS RMS.

(5) DIELECTRIC WITHSTANDING VOLTAGE (50,000 FEET): 650 VOLTS RMS

(6) INSULATION RESISTANCE: 1000 MEGOHMS, MINIMUM AT 500 VOLTS DC

C. MECHANICAL:

(1) PULL: 8 POUNDS PER MIL-T-55155/7, ITEM 1 OR MIL-T-55155/5, ITEM 1

(2) TORQUE: 3 OUNCE-INCHES PER MIL-T-55155/7, ITEM 1 OR MIL-T-55155/5, ITEM 1

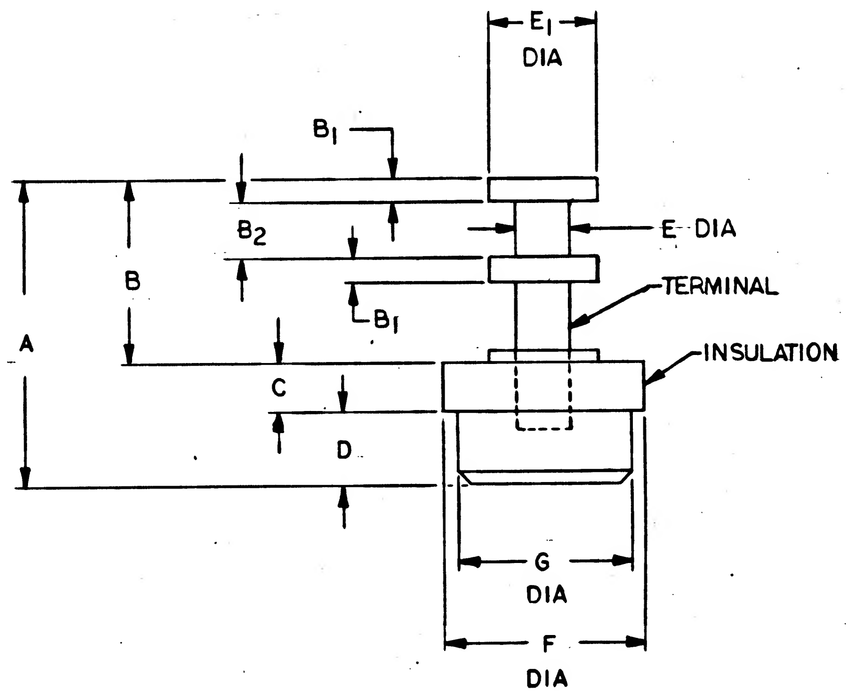


TABLE 1

NASA PART NUMBER	CAPACITANCE pf	INSULATION COLOR	A	B	B_1	B_2	C	D	E	E_1	F	G
1010623-1	0.35	WHITE	.259 .149	.159 .149	.025 .015	.051 .041	.045 .035	.065 .058	.051 .041	.098 .088	.177 .167	.150 .148
1010623-2	0.40	WHITE	.315 .305	.175 .165	.025 .015	.065 .055	.045 .035	.105 .095	.035 .025	.065 .055	.130 .120	.095 .093
1010623-3	0.50	WHITE	.315 .305	.215 .205	.025 .015	.105 .095	.045 .035	.065 .055	.045 .035	.085 .075	.177 .167	.150 .148

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 24 June 63
CHECKED A. Martz 7-29-63
APPROVAL J. Smith 7-29-63
APPROVAL
NASA APPROVAL W. J. Smith 8/7/63
MIT APPROVAL W Kupfer 7 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL, TURRET
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010623
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

—	1010623

REVISIONS 02471			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A	7 Aug 63	WR

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404 CLASS 3.

C. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-T-55155.

2. INSPECTION AND ACCEPTANCE:

A. MECHANICAL REQUIREMENTS

(1) DIMENSIONS PER DRAWING

B. MARKING:

(1) UNIT PACKAGES SHALL BE MARKED PER MIL-STD-129 WITH THE MANUFACTURER'S NAME OR SYMBOL, PART NUMBER AND THE NASA DRAWING NUMBER AND REVISION LETTER.

C. PACKAGING AND PACKING:

(1) UNITS SHALL BE PACKAGED IN ACCORDANCE WITH MANUFACTURER'S BEST COMMERCIAL PRACTICE.

3. DESIGN REQUIREMENTS:

A. MATERIAL:

(1) TERMINAL: BRASS, PER QQ-B-626, COMPOSITION 22, 1/2 HARD, SOLDER FINISH PER MIL-F-14072, TYPE M222.

(2) INSULATION: POLYTETRAFLUOROETHYLENE PER MIL-M-14077 OR MIL-P-19468.

B. ELECTRICAL RATING:

(1) NOMINAL VOLTAGE RATING: 1000 VRMS

(2) FLASHOVER VOLTAGE AT SEA LEVEL: 3000 VRMS

(3) CAPACITANCE: 0.35 uuf.

(4) DIELECTRIC WITHSTANDING VOLTAGE (SEA LEVEL): 1500 VOLTS RMS.

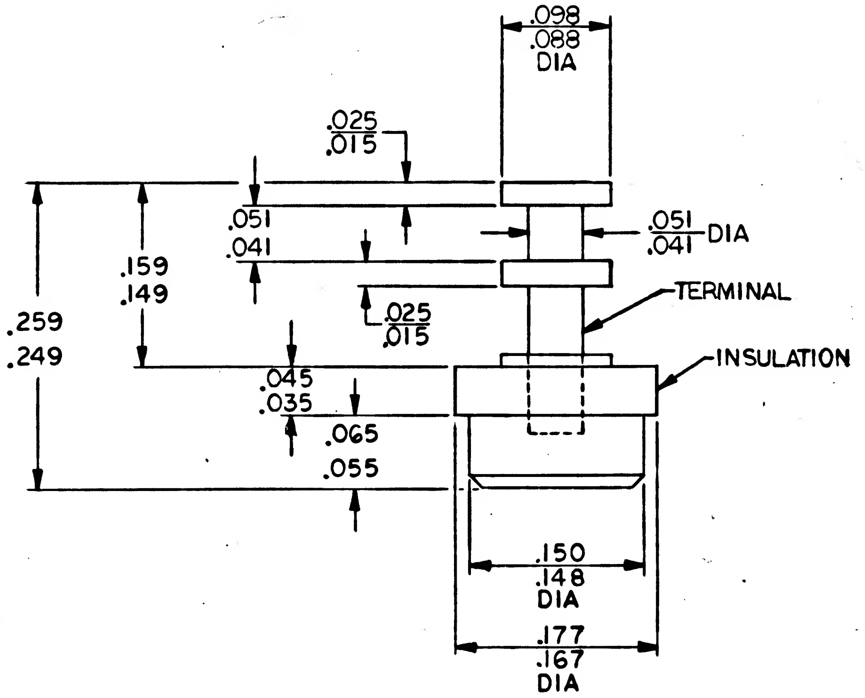
(5) DIELECTRIC WITHSTANDING VOLTAGE (50,000 FEET): 650 VOLTS RMS

(6) INSULATION RESISTANCE: 1000 MEGOHMS, MINIMUM AT 500 VOLTS DC

C. MECHANICAL:

(1) PULL: 8 POUNDS PER MIL-T-55155/7, ITEM 1

(2) TORQUE: 3 OUNCE-INCHES PER MIL-T-55155/7, ITEM 1



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN R. Kone DATE 24 June 63
CHECKED A. Martz 7-29-63
APPROVAL S. C. Smith 7-29-63
APPROVAL
NASA APPROVAL W. J. Smith 8/7/63
MIT APPROVAL W. Kopfer 7 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL, TURRET

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010623
SCALE NONE
WT
SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010624	A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04260	10/30/63	W.K.
A	REV A REPLACED BY REV B WITH CHANGES PER TDRR 07320	4/7/64	WK RPK

Ⓜ

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.

UNITS SHALL MEET ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002056 UNLESS MODIFIED OR AMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

LAMP MODULES SHALL MEET ALL REQUIREMENTS OF MS 24367 AND SELECTED PER REQUIREMENTS SPECIFIED IN INSPECTION AND ACCEPTANCE SECTION.

INSPECTION & ACCEPTANCE :

LAMP MODULE SELECTION (EACH LAMP MODULE (2 REQD PER ASSEMBLY) SHALL BE SELECTED TO THE FOLLOWING ENVELOPE AND FILAMENT CONDITIONS :

ENVELOPE:

1. FREE FROM SCRATCHES, CHIPS, PITTING AND RELIEF CRACKS.
2. FREE FROM AIR BUBBLES AND DISCOLORATION.
3. SHALL HAVE NO LOOSE PARTICLES WITHIN.
4. SHALL BE MANUFACTURED IN A WORKMANLIKE MANNER FREE FROM ANY DEFORMATIONS.

FILAMENT:

1. SHALL BE UNIFORM IN HEIGHT AND SHALL LIE IN THE PLANE FROM SUPPORT POST TO SUPPORT POST WITH A TOLERANCE OF ± 2 FILAMENT WIDTHS.
2. FILAMENT LEAD OR ANY PORTION OF THE FILAMENT SHALL NOT TOUCH ENVELOPE.
3. FILAMENT SHALL BE COILED IN A UNIFORM MANNER AND SHALL NOT BE CRUSHED, COMPRESSED OR UNBALANCED.

MECHANICAL REQUIREMENTS:

MARKING: THE FOLLOWING SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART:

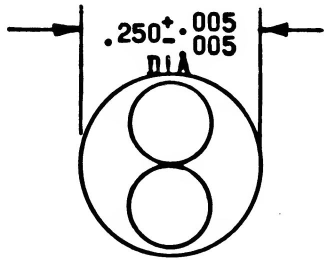
NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER.

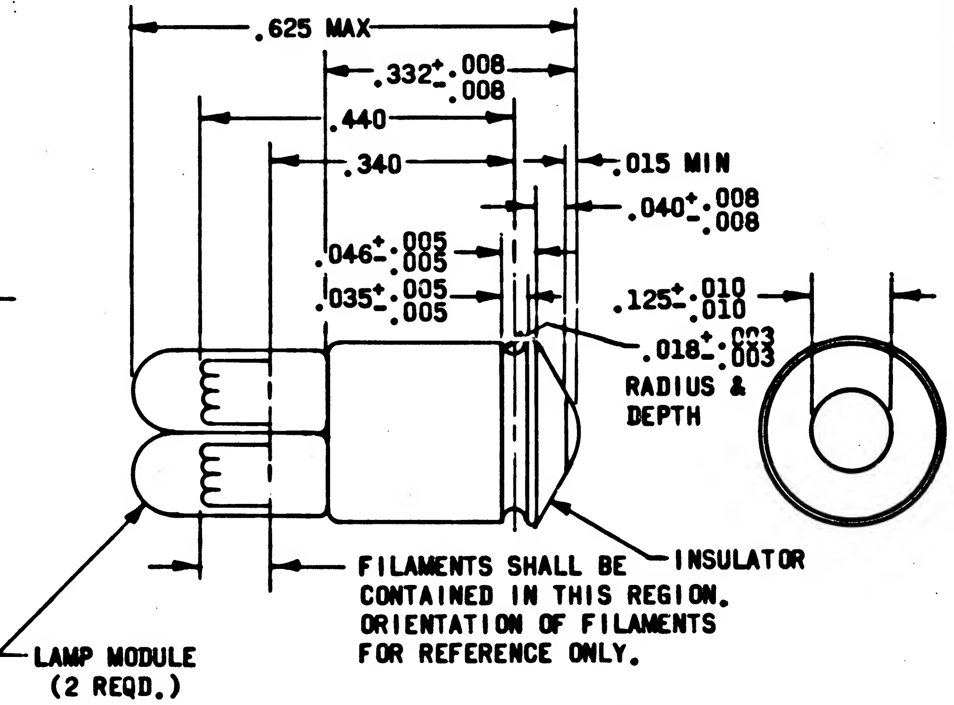
MANUFACTURER'S NAME OR TRADEMARK

MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

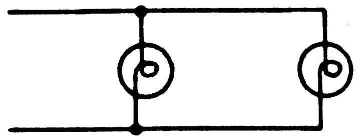
ASSEMBLY STRENGTH: EACH LAMP MODULE SHALL BE FIRMLY SECURED IN LAMP BASE

WORKMANSHIP: EACH LAMP ASSEMBLY SHALL BE MANUFACTURED IN A WORKMANLIKE MANNER FREE FROM EXCESSIVE EPOXIES AND ANY DEFORMATIONS.





A	A
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	



SCHEMATIC DIAGRAM

Ⓐ REPLACED BY REV Ⓑ WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES ON

FRACTIONS ± DECIMALS ± .015 ANGLES ±

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES

HEAT TREATMENT NONE

FINAL FINISH NONE

MIT INSTRUMENTATION LAB CAMBRIDGE MASS

DWG NO CONTRACT NAS9-497

DRAWN BENDER DATE 3-JUN-63

CHECKED Wilson 3 June 63

APPROVAL 10/29/63

APPROVAL

NASA APPROVAL 10/31/63

MIT APPROVAL 30 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LAMP, INCANDESCENT
(5 VOLT, DUAL BULB)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010624

SCALE NONE WT SHEET 1 OF 2

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS 04260

SYM	DESCRIPTION	DATE	APPROVAL
A	REPLACED BY REV B WITH CHANGES PER TDRR 07320	4/7/64	WK

ELECTRICAL REQUIREMENTS: PER TABLE I (VALUES SHOWN ARE FOR TOTAL ASSEMBLY)

DESIGN REQUIREMENTS:
LAMP MODULE COLOR: EACH LAMP MODULE SHALL BE CLEAR IN COLOR.
LAMP ASSEMBLY BASE: STANDARD MIDGET GROOVE
ENVIRONMENT:
VIBRATION: 15 G THROUGH 2000 CPS. 0.3" DOUBLE AMPLITUDE TO 36 CPS.
SHOCK: 100 G
TEMPERATURE: $-65^{\circ}C$ TO $+85^{\circ}C$.
HUMIDITY: 10 CYCLES PER MIL-E-5272C, RANGE 20° TO $71^{\circ}C$.
ALTITUDE: 120,000 FEET.
MATERIALS AND FINISHES: ALL MATERIALS AND FINISHES USED IN THESE UNITS SHALL NOT OUTGAS ANY TOXIC OR CORROSIVE GASES OR CORRODE OR DETERIORATE AS A RESULT OF THE ENVIRONMENTS LISTED AND/OR 100% OXYGEN ATMOSPHERE.

TABLE I

DASH NUMBER	VOLTAGE RATING (VOLTS)	CURRENT RATING (AMPS)	AVERAGE LIFE HOURS AT		MEAN SPHERICAL CANDLE POWER AT 5 VOLTS	INDIVIDUAL LAMP MODULE NO. (2 REQUIRED)
			5 VOLTS	6 VOLTS		
1	5.0	.120 ± 10%	60,000	6,000	.064 ± 25%	MS24367-680
2	5.0	.120 ± 10%	60,000	6,000	.106 ± 25%	MS24367-683
3	5.0	.150 ± 10%	16,000	1,600	.176 ± 25%	MS24367-713
4	5.0	.230 ± 10%	16,000	1,600	.294 ± 25%	MS24367-715

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY
USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS9-497
DRAWN BENDER DATE 3-JUN-63
CHECKED Wilson 5 June 63
APPROVAL
APPROVAL
NASA APPROVAL 12/30/63
MIT APPROVAL 30 Dec 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LAMP, INCANDESCENT
(5 VOLT, DUAL BULB)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010624
SCALE NONE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES PER TDRR 07320	4/7/64	

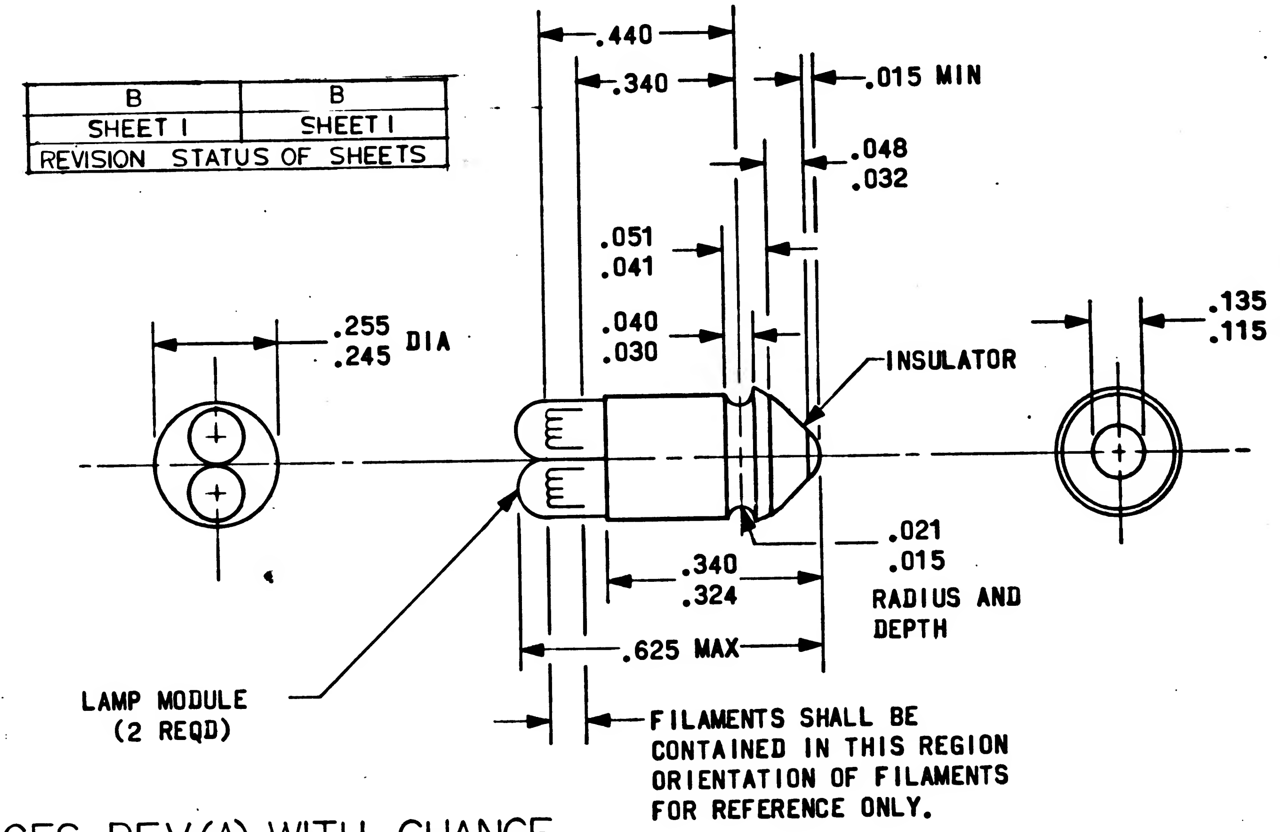
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002056 UNLESS MODIFIED OR AMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MARKING: EACH ASSEMBLY SHALL BE MARKED ON THE LAMP BASE WITH THE MANUFACTURER'S NAME OR APPROVED TRADEMARK AND PART NUMBER, PER ND1002019.
     - (2) UNIT PACKAGES AND SHIPPING CONTAINERS SHALL BE MARKED WITH THE NASA DWG NO., REV. AND DASH NO. PER MIL-STD-129.
     - (3) WORKMANSHIP: EACH LAMP ASSEMBLY SHALL BE MANUFACTURED IN A WORKMANLIKE MANNER FREE FROM EXCESSIVE EPOXIES AND ANY DEFORMATIONS.
     - (4) LAMP MODULE SELECTION (100%): EACH LAMP MODULE (2 REQ'D PER ASSEMBLY) SHALL BE SELECTED TO THE FOLLOWING ENVELOPE AND FILAMENT REQUIREMENTS.
       - (a) ENVELOPE:
         - 1) SHALL BE FREE FROM SCRATCHES, CHIPS, PITTING AND CRACKS ON THE INTERNAL SURFACE WHEN VIEWED UNDER A 10X MICROSCOPE.
         - 2) SHALL BE FREE FROM SCRATCHES, CHIPS, PITTING AND CRACKS ON THE EXTERNAL SURFACE WHICH PROTRUDE INTO THE SURFACE TO THE EXTENT THAT A FINGERNAIL CATCHES ON THE DEFECT.
         - 3) SHALL BE FREE FROM DISCOLORATION TO THE EXTENT THAT NOT MORE THAN 10% OF THE ENVELOPE SHALL BE DISCOLORED.
         - 4) SHALL HAVE NO LOOSE PARTICLES WITHIN WHEN VIEWED WITH A 30X MICROSCOPE.
       - (b) FILAMENT:
         - 1) FILAMENT SHALL BE COILED IN A UNIFORM MANNER AND SHALL NOT BE CRUSHED, COMPRESSED OR UNBALANCED WHEN VIEWED UNDER A 10X MICROSCOPE.
         - 2) SHALL NOT EXCEED THE CONDITIONS AS SHOWN IN FIGURE 2.
   - B. ELECTRICAL REQUIREMENTS:
     - (1) PER TABLE I (VALUES SHOWN ARE FOR THE TOTAL MODULE)

B	B
SHEET I	SHEET I
REVISION STATUS OF SHEETS	



Ⓑ REPLACES REV (A) WITH CHANGE

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.015 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN G. [illegible] DATE 2 MAR 64
CHECKED E. Piojda 6 MAR 64
APPROVAL Y. F. [illegible] 4/3/64
APPROVAL
NASA APPROVAL W. S. [illegible] 4/7/64
MIT APPROVAL W. [illegible] 7 Apr 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LAMP, INCANDESCENT
(5 VOLT, DUAL BULB)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010624
SCALE NONE WT SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

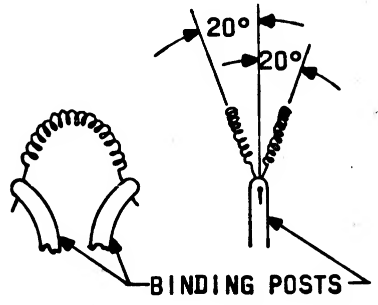
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010624 B

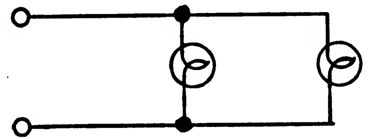
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES PER TDRR 07320	4/7/64	WK

REQUIREMENTS: (CONTINUED)

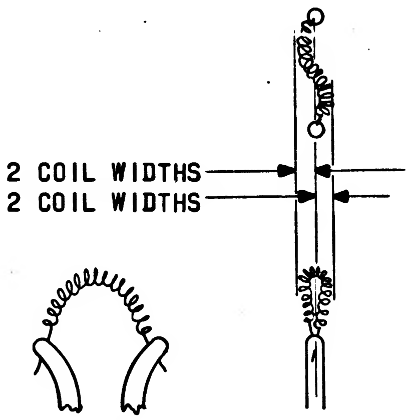
3. DESIGN REQUIREMENTS:
   - A. LAMP MODULE COLOR: EACH LAMP MODULE SHALL BE CLEAR IN COLOR.
   - B. LAMP ASSEMBLY BASE: STANDARD MIDGET FLANGE.
   - C. ENVIRONMENT:
     - (1) VIBRATION: 15 G THROUGH 2000 CPS, 0.3" DOUBLE AMPLITUDE TO 36 CPS.
     - (2) SHOCK: 100G
     - (3) TEMPERATURE: -65°C TO +85°C.
     - (4) HUMIDITY: 10 CYCLES PER MIL-E-5272, RANGE 20°C TO 71°C.
     - (5) ALTITUDE: 120,000 FEET.



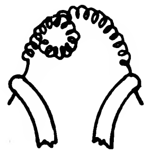
CONDITION 1 - FILAMENT SHALL NOT BE SWAYED IN EXCESS OF 20°, FROM A PLANE PASSING THRU THE BINDING POST



SCHEMATIC DIAGRAM



CONDITION 2 - FILAMENT SHALL NOT BE DISPLACED FROM A PLANE PASSING THRU THE BINDING POST BY ± 2 COIL WIDTHS



CONDITION 3 - FILAMENT SHALL NOT BE LOOPED IN ONE OR MORE LOOPS

FIGURE 2

TABLE I

NASA DASH NUMBER	VOLTAGE RATING (VOLTS)	CURRENT RATING (AMPS)	AVERAGE LIFE HOURS AT 5 VOLTS	AVERAGE LIFE HOURS AT 6 VOLTS	MEAN SPHERICAL CANDLE POWER AT 5 VOLTS
-1	5.0	.120 ± 10%	60,000	6,000	.064 ± 15%
-2	5.0	.120 ± 10%	60,000	6,000	.106 ± 15%
-3	5.0	.150 ± 10%	16,000	1,600	.176 ± 15%
-4	5.0	.230 ± 10%	16,000	1,600	.254 ± 15%

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO Contract NAS 9-497
DRAWN DATE 2 MAR 64
CHECKED C. Pioda 6 MAR 64
APPROVAL 4/7/64
APPROVAL
NASA APPROVAL 4/7/64
MIT APPROVAL

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HOUSTON, TEXAS

LAMP, INCANDESCENT
(5 VOLT, DUAL BULB)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO 1010624
SCALE WT SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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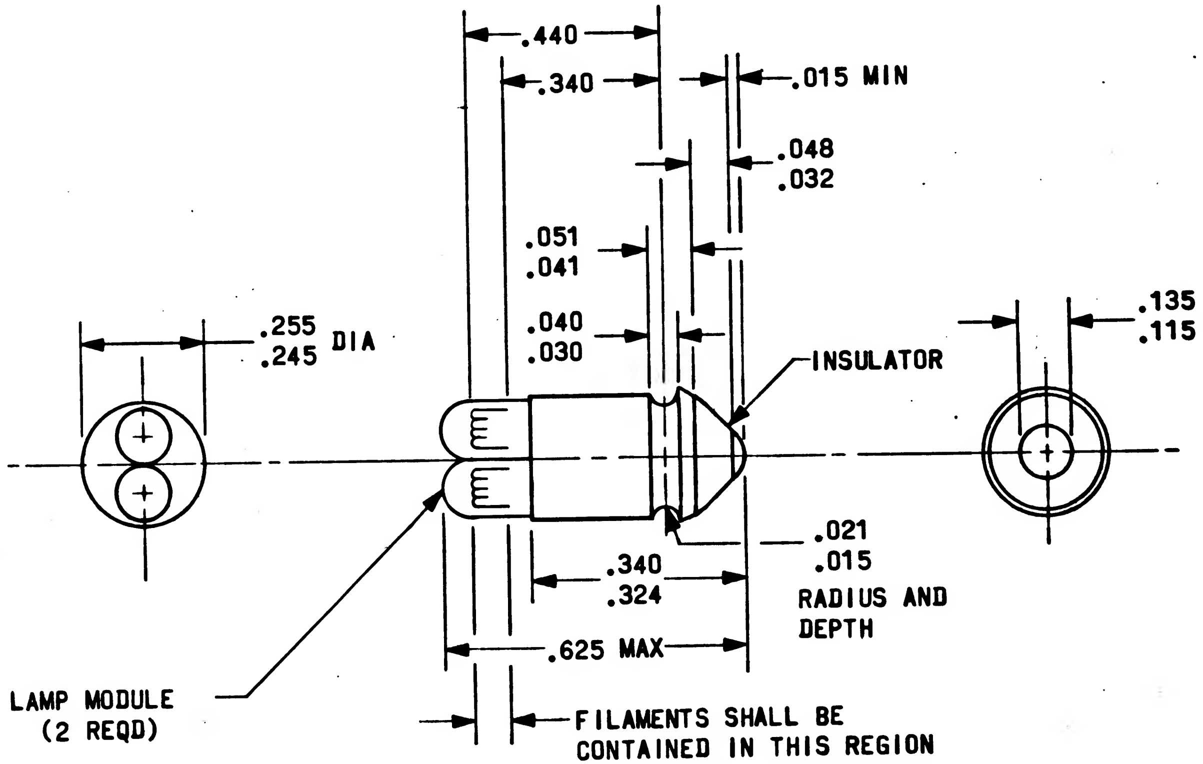
1010624 C

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES PER TDRR 07320	4/7/64	ERK WR
C	REVISED PER TDRR 11505	18 Aug 64	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002056 UNLESS MODIFIED OR AMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MARKING: EACH ASSEMBLY SHALL BE MARKED ON THE LAMP BASE WITH THE MANUFACTURER'S NAME OR APPROVED TRADEMARK AND PART NUMBER, PER ND1002019.
     - (2) UNIT PACKAGES AND SHIPPING CONTAINERS SHALL BE MARKED WITH THE NASA DWG NO., REV. AND DASH NO. PER MIL-STD-129.
     - (3) WORKMANSHIP: EACH LAMP ASSEMBLY SHALL BE MANUFACTURED IN A WORKMANLIKE MANNER FREE FROM EXCESSIVE EPOXIES AND ANY DEFORMATIONS.
     - (4) LAMP MODULE SELECTION (100%): EACH LAMP MODULE (2 REQ'D PER ASSEMBLY) SHALL BE SELECTED TO THE FOLLOWING ENVELOPE AND FILAMENT REQUIREMENTS.
       - (a) ENVELOPE:
         - 1) SHALL BE FREE FROM SCRATCHES, CHIPS, PITTING AND CRACKS ON THE INTERNAL SURFACE WHEN VIEWED UNDER A 10X MICROSCOPE.
         - 2) SHALL BE FREE FROM SCRATCHES, CHIPS, PITTING AND CRACKS ON THE EXTERNAL SURFACE WHICH PROTRUDE INTO THE SURFACE TO THE EXTENT THAT A FINGERNAIL CATCHES ON THE DEFECT.
         - 3) SHALL BE FREE FROM DISCOLORATION TO THE EXTENT THAT NOT MORE THAN 10% OF THE ENVELOPE SHALL BE DISCOLORED.
         - 4) SHALL HAVE NO LOOSE PARTICLES WITHIN WHEN VIEWED WITH A 30X MICROSCOPE.
       - (b) FILAMENT:
         - 1) FILAMENT SHALL BE COILED IN A UNIFORM MANNER AND SHALL NOT BE CRUSHED, COMPRESSED OR UNBALANCED WHEN VIEWED UNDER A 10X MICROSCOPE.
         - 2) SHALL NOT EXCEED THE CONDITIONS AS SHOWN IN FIGURE 2.
   - B. ELECTRICAL REQUIREMENTS:
     - (1) PER TABLE I (VALUES SHOWN ARE FOR THE TOTAL MODULE)



FILAMENTS SHALL BE CONTAINED IN THIS REGION ORIENTATION OF FILAMENTS FOR REFERENCE ONLY.

Ⓑ REPLACES REV(A) WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.015 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. Contract NAS 9-497

DRAWN G. Mehale DATE 2 MAR 64
CHECKED E. Pizzida 6 MAR 64
APPROVAL Y F Kun 4/7/64
APPROVAL
NASA APPROVAL W. J. D. 4/7/64
MIT APPROVAL W Kupfer 7 Apr 64

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LAMP, INCANDESCENT
(5 VOLT, DUAL BULB)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010624
SCALE NONE	WT	SHEET 1 OF 2

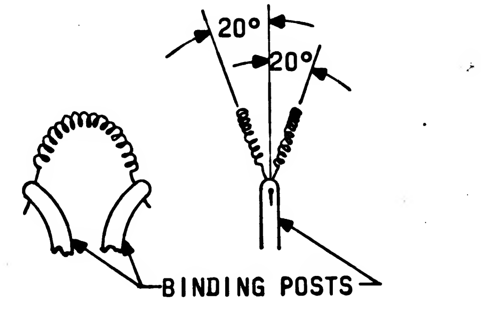
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

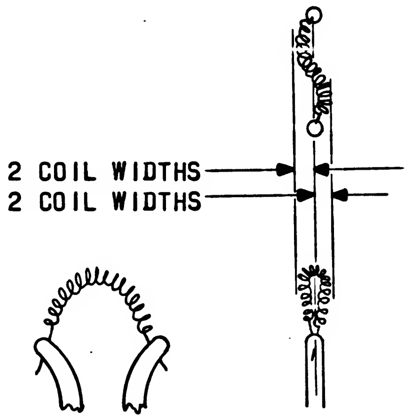
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES PER TDRR 07320	4/7/64	edk WK
C	REVISED PER TDRR 11505	8/18/64	WK

REQUIREMENTS: (CONTINUED)

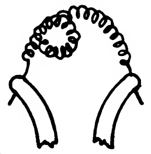
3. DESIGN REQUIREMENTS:
   - A. LAMP MODULE COLOR: EACH LAMP MODULE SHALL BE CLEAR IN COLOR.
   - B. LAMP ASSEMBLY BASE: STANDARD MIDGET GROOVE
   - C. ENVIRONMENT:
     - (1) VIBRATION: 15 G THROUGH 2000 CPS. 0.3" DOUBLE AMPLITUDE TO 36 CPS.
     - (2) SHOCK: 100G
     - (3) TEMPERATURE: -65°C TO +85°C.
     - (4) HUMIDITY: 10 CYCLES PER MIL-E-5272, RANGE 20°C TO 71°C.
     - (5) ALTITUDE: 120,000 FEET.



CONDITION 1 - FILAMENT SHALL NOT BE SWAYED IN EXCESS OF 20°, FROM A PLANE PASSING THRU THE BINDING POST

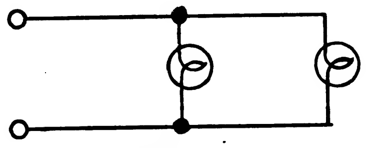


CONDITION 2 - FILAMENT SHALL NOT BE DISPLACED FROM A PLANE PASSING THRU THE BINDING POST BY ± 2 COIL WIDTHS



CONDITION 3 - FILAMENT SHALL NOT BE LOOPED IN ONE OR MORE LOOPS

FIGURE 2



SCHEMATIC DIAGRAM

TABLE I

NASA DASH NUMBER	VOLTAGE RATING (VOLTS)	CURRENT RATING (AMPS)	AVERAGE LIFE HOURS AT		MEAN SPHERICAL CANDLE POWER AT 5 VOLTS DC(±2%)
			5 VOLTS	6 VOLTS	
-1	5.0	.120 ± 10%	60,000	6,000	.054 ± 25%
-2	5.0	.120 ± 10%	60,000	6,000	0.078 ± 0.125
-3	5.0	.150 ± 10%	16,000	1,600	.150 ± 25%
-4	5.0	.230 ± 10%	16,000	1,600	.215 ± 25%

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO Contract NAS 9-497
DRAWN G. Mahal DATE 2 MAR 64
CHECKED C. Pujda 6 MAR 64
APPROVAL J. Klein 4/7/64
APPROVAL
NASA APPROVAL 4/7/64
MIT APPROVAL W Kupfer 7 Apr 64

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO 1010624
SCALE | WT | SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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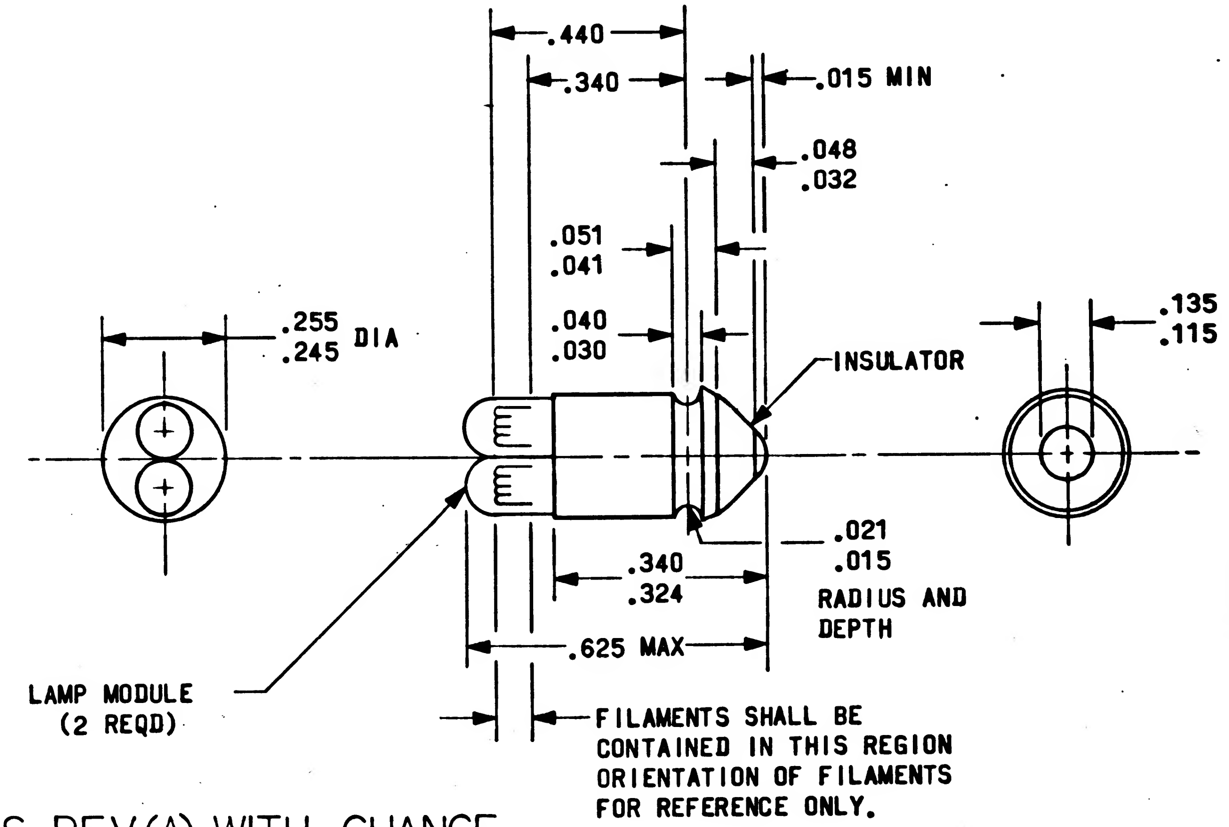
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES PER TDRR 07320	4/7/64	ERK WR
C	REVISED PER TDRR 11505	18 Aug 64	WR
D	REVISED PER TDRR 12212	9/1/64	WR

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002056 UNLESS MODIFIED OR AMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MARKING: EACH ASSEMBLY SHALL BE MARKED ON THE LAMP BASE WITH THE MANUFACTURER'S NAME OR APPROVED TRADEMARK AND PART NUMBER, PER ND1002019.
     - (2) UNIT PACKAGES AND SHIPPING CONTAINERS SHALL BE MARKED WITH THE NASA DWG NO., REV. AND DASH NO. PER MIL-STD-129.
     - (3) WORKMANSHIP: EACH LAMP ASSEMBLY SHALL BE MANUFACTURED IN A WORKMANLIKE MANNER FREE FROM EXCESSIVE EPOXIES AND ANY DEFORMATIONS.
     - (4) LAMP MODULE SELECTION (100%): EACH LAMP MODULE (2 REQ'D PER ASSEMBLY) SHALL BE SELECTED TO THE FOLLOWING ENVELOPE AND FILAMENT REQUIREMENTS.
       - (a) ENVELOPE:
         - 1) SHALL BE FREE FROM SCRATCHES, CHIPS, PITTING AND CRACKS ON THE INTERNAL SURFACE WHEN VIEWED UNDER A 10X MICROSCOPE.
         - 2) SHALL BE FREE FROM SCRATCHES, CHIPS, PITTING AND CRACKS ON THE EXTERNAL SURFACE WHICH PROTRUDE INTO THE SURFACE TO THE EXTENT THAT A FINGERNAIL CATCHES ON THE DEFECT.
         - 3) SHALL BE FREE FROM DISCOLORATION TO THE EXTENT THAT NOT MORE THAN 10% OF THE ENVELOPE SHALL BE DISCOLORED.
         - 4) SHALL HAVE NO LOOSE PARTICLES WITHIN WHEN VIEWED WITH A 30X MICROSCOPE.
       - (b) FILAMENT:
         - 1) FILAMENT SHALL BE COILED IN A UNIFORM MANNER AND SHALL NOT BE CRUSHED, COMPRESSED OR UNBALANCED WHEN VIEWED UNDER A 10X MICROSCOPE.
         - 2) SHALL NOT EXCEED THE CONDITIONS AS SHOWN IN FIGURE 2.
   - B. ELECTRICAL REQUIREMENTS:
     - (1) PER TABLE I (VALUES SHOWN ARE FOR THE TOTAL MODULE)



Ⓑ REPLACES REV(A) WITH CHANGE

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.015 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
SEE REQUIREMENTS
HEAT TREATMENT
NONE
FINAL FINISH
NONE

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO Contract NAS 9-497
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CHECKED E. Pisojda 6 MAR 64
APPROVAL 4/7/64
APPROVAL
NASA APPROVAL 4/7/64
MIT APPROVAL 7 Apr 64

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010624
SCALE NONE WT SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010624 D

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS			
B	REPLACES REV A WITH CHANGES PER TDRR 07320	4/7/64	EOK WK
C	REVISED PER TDRR 11505	8/18/64	WK
D	REVISED PER TDRR 12212	9/1/64	WK

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS: (CONTINUED)

3. DESIGN REQUIREMENTS:
   - A. LAMP MODULE COLOR: EACH LAMP MODULE SHALL BE CLEAR IN COLOR.
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   - C. ENVIRONMENT:
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     - (2) SHOCK: 100G
     - (3) TEMPERATURE: -65°C TO +85°C.
     - (4) HUMIDITY: 10 CYCLES PER MIL-E-5272, RANGE 20°C TO 71°C.
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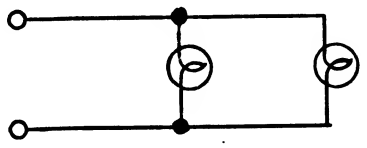
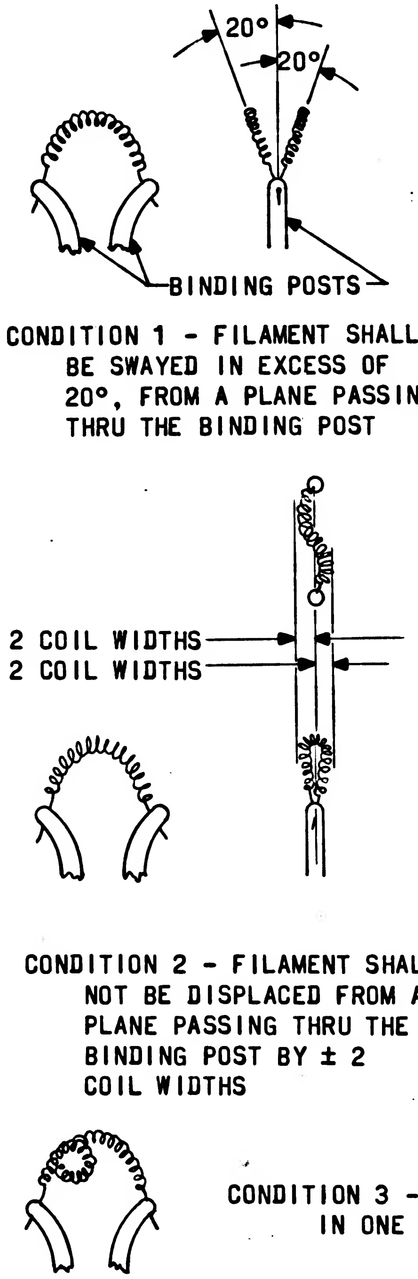


SCHEMATIC DIAGRAM



CONDITION 1 - FILAMENT SHALL NOT BE SWAYED IN EXCESS OF 20°, FROM A PLANE PASSING THRU THE BINDING POST

CONDITION 2 - FILAMENT SHALL NOT BE DISPLACED FROM A PLANE PASSING THRU THE BINDING POST BY ± 2 COIL WIDTHS

CONDITION 3 - FILAMENT SHALL NOT BE LOOPED IN ONE OR MORE LOOPS

FIGURE 2

TABLE I

NASA DASH NUMBER	VOLTAGE RATING (VOLTS)	CURRENT RATING (AMPS)	AVERAGE LIFE HOURS AT		MEAN SPHERICAL CANDLE POWER AT 5 VOLTS DC(±2%)
			5 VOLTS	6 VOLTS	
-1	5.0	.120 ± 10%	60,000	6,000	.054 ±25%
-2	5.0	.120 ± 10%	60,000	6,000	0.078 TO 0.125
-3	5.0	.150 ± 10%	16,000	1,600	.150±25%
-4	5.0	.230 ± 10%	16,000	1,600	.215±25%

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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HEAT TREATMENT
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CAMBRIDGE MASS
DWG NO Contract NAS 9-497
DRAWN G. Mahal DATE 2 MAR 64
CHECKED C. Pioda 6 MAR 64
N.H. APPROVAL J. Klein 4/7/64
APPROVAL
NASA APPROVAL W. S. S. 4/7/64
MIT APPROVAL W Kupfer 7 Apr 64

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO 1010624
SCALE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES PER TDRR 07320	4/7/64	EPK WR
C	REVISED PER TDRR 11505	18 Aug 64	WR
D	REVISED PER TDRR 12212	9/1/64	WR
E	REVISED PER TDRR 16135	2/5/65	WR

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002056 UNLESS MODIFIED OR AMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

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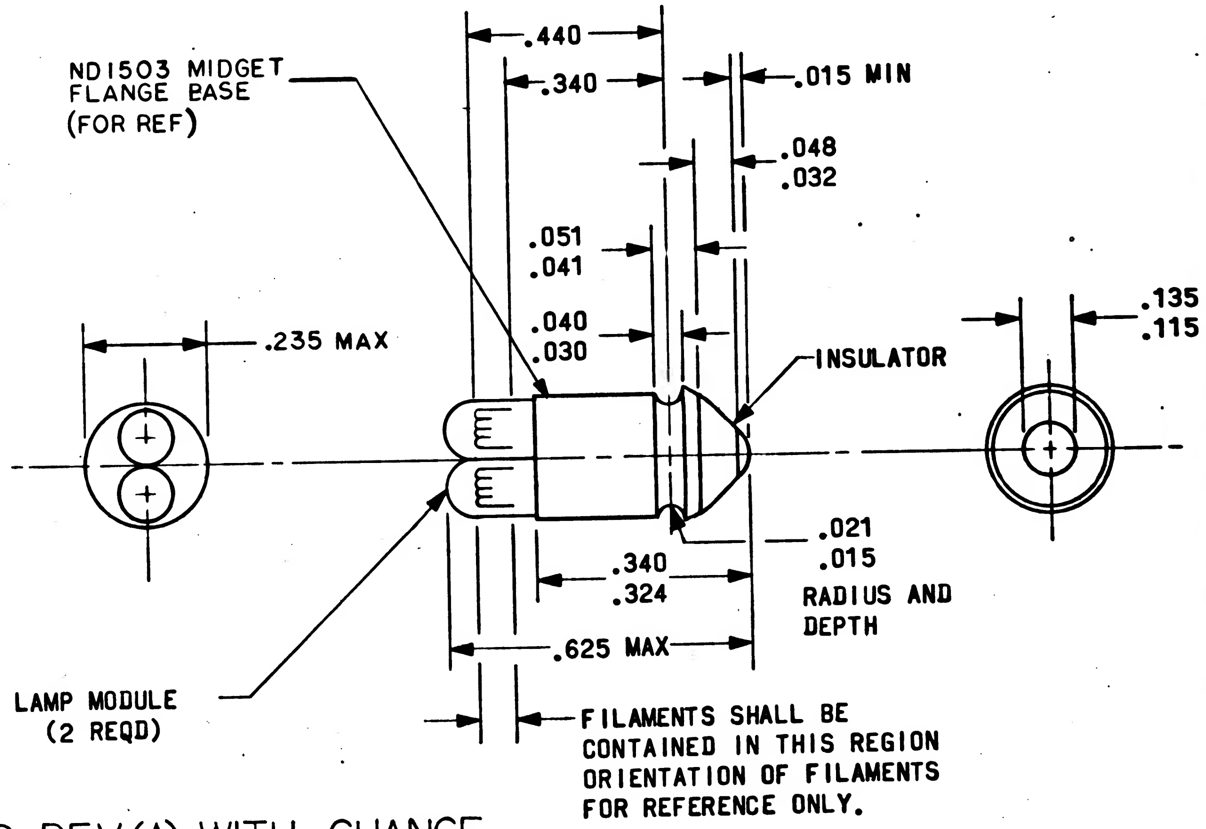
         - 1) FILAMENT SHALL BE COILED IN A UNIFORM MANNER AND SHALL NOT BE CRUSHED, COMPRESSED OR UNBALANCED WHEN VIEWED UNDER A 10X MICROSCOPE.
         - 2) SHALL NOT EXCEED THE CONDITIONS AS SHOWN IN FIGURE 2.
   - B. ELECTRICAL REQUIREMENTS:
     - (1) PER TABLE I (VALUES SHOWN ARE FOR THE TOTAL MODULE)



FILAMENTS SHALL BE CONTAINED IN THIS REGION ORIENTATION OF FILAMENTS FOR REFERENCE ONLY.

Ⓑ REPLACES REV(A) WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ±.015 ANGLES ±	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS DWG. NO. Contract NAS 9-497
DO NOT SCALE THIS DRAWING	DRAWN G. [illegible] DATE 2 MAR 64 CHECKED E. Pizzida 6 MAR 64 APPROVAL Y. F. Ken 4/2/64 APPROVAL
MATERIAL SEE REQUIREMENTS	
HEAT TREATMENT NONE	NASA APPROVAL [illegible] 4/7/64
FINAL FINISH NONE	MIT APPROVAL W Kupfer 7 Apr 64

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(5 VOLT, DUAL BULB)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010624
SCALE NONE	WT	SHEET 1 OF 2

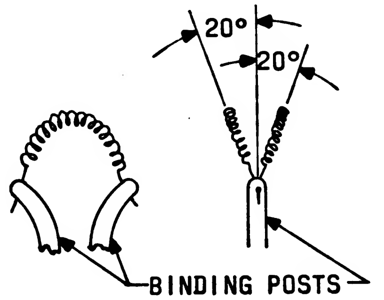
1010624 E

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

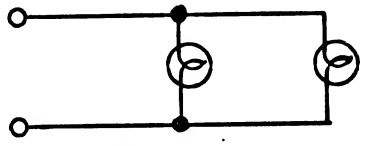
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES REV A WITH CHANGES PER TDRR 07320	4/7/64	WK
C	REVISED PER TDRR 11505	8/18/64	WK
D	REVISED PER TDRR 12212	9/1/64	WK
E	REVISED PER TDRR 16135	2/9/65	WK

REQUIREMENTS: (CONTINUED)

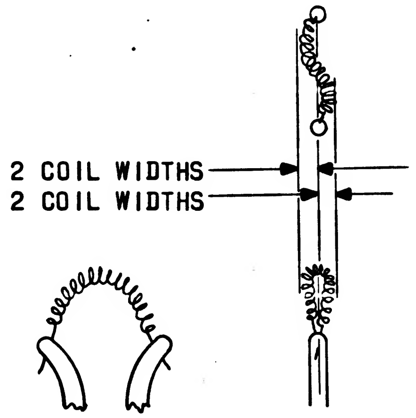
3. DESIGN REQUIREMENTS:
   - A. LAMP MODULE COLOR: EACH LAMP MODULE SHALL BE CLEAR IN COLOR.
   - B. LAMP ASSEMBLY BASE: STANDARD MIDGET GROOVE
   - C. ENVIRONMENT:
     - (1) VIBRATION: 15 G THROUGH 2000 CPS, 0.3" DOUBLE AMPLITUDE TO 36 CPS.
     - (2) SHOCK: 100G
     - (3) TEMPERATURE: -65°C TO +85°C.
     - (4) HUMIDITY: 10 CYCLES PER MIL-E-5272, RANGE 20°C TO 71°C.
     - (5) ALTITUDE: 120,000 FEET.



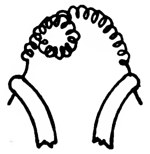
CONDITION 1 - FILAMENT SHALL NOT BE SWAYED IN EXCESS OF 20°, FROM A PLANE PASSING THRU THE BINDING POST



SCHEMATIC DIAGRAM



CONDITION 2 - FILAMENT SHALL NOT BE DISPLACED FROM A PLANE PASSING THRU THE BINDING POST BY ± 2 COIL WIDTHS



CONDITION 3 - FILAMENT SHALL NOT BE LOOPED IN ONE OR MORE LOOPS

FIGURE 2

TABLE I

NASA DASH NUMBER	VOLTAGE RATING (VOLTS)	CURRENT RATING (AMPS)	AVERAGE LIFE HOURS AT		MEAN SPHERICAL CANDLE POWER AT 5 VOLTS DC(±2%)
			5 VOLTS	6 VOLTS	
-1	5.0	.120 ± 10%	60,000	6,000	.054 ±25%
-2	5.0	.120 ± 10%	60,000	6,000	0.078 TO 0.125
-3	5.0	.150 ± 10%	16,000	1,600	.150±25%
-4	5.0	.230 ± 10%	16,000	1,600	.215±25%

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
Contract NAS 9-497

DRAWN G. Mashal DATE 2 MAR 64
CHECKED C. Pioda 6 MAR 64
APPROVAL J. Klein 4/2/64
APPROVAL
NASA APPROVAL W. S. [illegible] 4/7/64
MIT APPROVAL W Kupfer 7Apr64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LAMP, INCANDESCENT
(5 VOLT, DUAL BULB)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO 1010624
SCALE
WT
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

–	1010624

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
–	INITIAL RELEASE CLASS A PERTORR 04260	10/30/63	W.L.

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.

UNITS SHALL MEET ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002056 UNLESS MODIFIED OR AMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

LAMP MODULES SHALL MEET ALL REQUIREMENTS OF MS 24367 AND SELECTED PER REQUIREMENTS SPECIFIED IN INSPECTION AND ACCEPTANCE SECTION.

INSPECTION & ACCEPTANCE :

LAMP MODULE SELECTION (EACH LAMP MODULE (2 REQD PER ASSEMBLY) SHALL BE SELECTED TO THE FOLLOWING ENVELOPE AND FILAMENT CONDITIONS :

ENVELOPE:

1. FREE FROM SCRATCHES, CHIPS, PITTING AND RELIEF CRACKS.
2. FREE FROM AIR BUBBLES AND DISCOLORATION.
3. SHALL HAVE NO LOOSE PARTICLES WITHIN.
4. SHALL BE MANUFACTURED IN A WORKMANLIKE MANNER FREE FROM ANY DEFORMATIONS.

FILAMENT:

1. SHALL BE UNIFORM IN HEIGHT AND SHALL LIE IN THE PLANE FROM SUPPORT POST TO SUPPORT POST WITH A TOLERANCE OF ± 2 FILAMENT WIDTHS.
2. FILAMENT LEAD OR ANY PORTION OF THE FILAMENT SHALL NOT TOUCH ENVELOPE.
3. FILAMENT SHALL BE COILED IN A UNIFORM MANNER AND SHALL NOT BE CRUSHED, COMPRESSED OR UNBALANCED.

MECHANICAL REQUIREMENTS:

MARKING: THE FOLLOWING SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART:

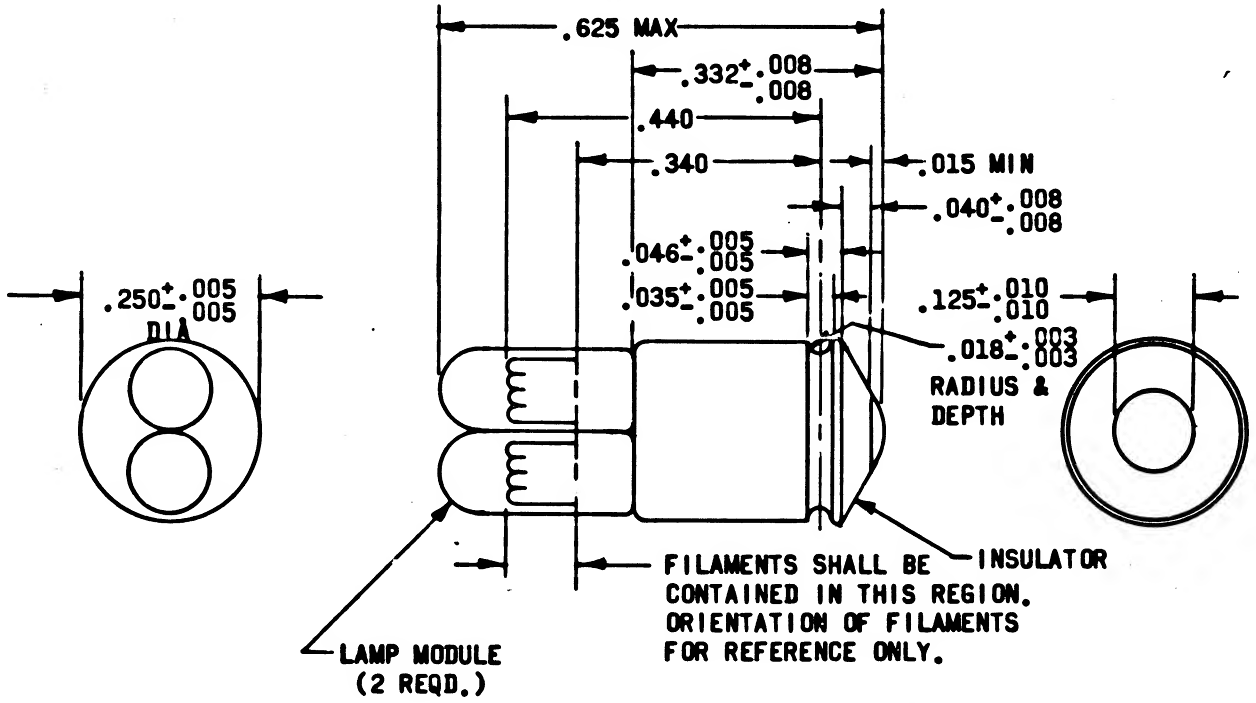
NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER.

MANUFACTURER'S NAME OR TRADEMARK

MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

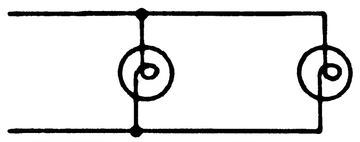
ASSEMBLY STRENGTH: EACH LAMP MODULE SHALL BE FIRMLY SECURED IN LAMP BASE

WORKMANSHIP: EACH LAMP ASSEMBLY SHALL BE MANUFACTURED IN A WORKMANLIKE MANNER FREE FROM EXCESSIVE EPOXIES AND ANY DEFORMATIONS.



FILAMENTS SHALL BE CONTAINED IN THIS REGION. ORIENTATION OF FILAMENTS FOR REFERENCE ONLY.

SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	



SCHEMATIC DIAGRAM

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
±	± .015	±

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES

HEAT TREATMENT NONE

FINAL FINISH NONE

MIT INSTRUMENTATION LAB CAMBRIDGE MASS

DWG NO

CONTRACT NAS9-497

DRAWN BENDER DATE 3-JUN-63

CHECKED Wilson 3 June 63

APPROVAL 10/29/63

APPROVAL

NASA APPROVAL 10/30/63

MIT APPROVAL 30 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LAMP, INCANDESCENT
(5 VOLT, DUAL BULB)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.	
	C	1010624	
SCALE NONE	WT		SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS 04260

SYM	DESCRIPTION	DATE	APPROVAL

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

ELECTRICAL REQUIREMENTS: PER TABLE I (VALUES SHOWN ARE FOR TOTAL ASSEMBLY)

DESIGN REQUIREMENTS:
LAMP MODULE COLOR: EACH LAMP MODULE SHALL BE CLEAR IN COLOR.
LAMP ASSEMBLY BASE: STANDARD MIDGET GROOVE
ENVIRONMENT:
VIBRATION: 15 G THROUGH 2000 CPS. 0.3" DOUBLE AMPLITUDE TO 36 CPS.
SHOCK: 100 G
TEMPERATURE: -65°C TO +85°C.
HUMIDITY: 10 CYCLES PER MIL-E-5272C, RANGE 20° TO 71°C.
ALTITUDE: 120,000 FEET.
MATERIALS AND FINISHES: ALL MATERIALS AND FINISHES USED IN THESE UNITS SHALL NOT OUTGAS ANY TOXIC OR CORROSIVE GASES OR CORRODE OR DETERIORATE AS A RESULT OF THE ENVIRONMENTS LISTED AND/OR 100% OXYGEN ATMOSPHERE.

TABLE I

DASH NUMBER	VOLTAGE RATING (VOLTS)	CURRENT RATING (AMPS)	AVERAGE LIFE HOURS AT		MEAN SPHERICAL CANDLE POWER AT 5 VOLTS	INDIVIDUAL LAMP MODULE NO. (2 REQUIRED)
			5 VOLTS	6 VOLTS		
1	5.0	.120 ± 10%	60,000	6,000	.064 ± 25%	MS24367-680
2	5.0	.120 ± 10%	60,000	6,000	.106 ± 25%	MS24367-683
3	5.0	.150 ± 10%	16,000	1,600	.176 ± 25%	MS24367-713
4	5.0	.230 ± 10%	16,000	1,600	.294 ± 25%	MS24367-715

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS9-497
DRAWN BENDER DATE 3-JUN-63
CHECKED Wilson 5 June 63
APPROVAL 10/29/63
APPROVAL
NASA APPROVAL 10/30/63
MIT APPROVAL 30 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LAMP, INCANDESCENT
(5 VOLT, DUAL BULB)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010624
SCALE NONE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

A	1010625

REVISIONS 02474			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A	Xmy 63	WK
A	REVISED PER TDRR 03504	10-1-63	WK

REQUIREMENTS:

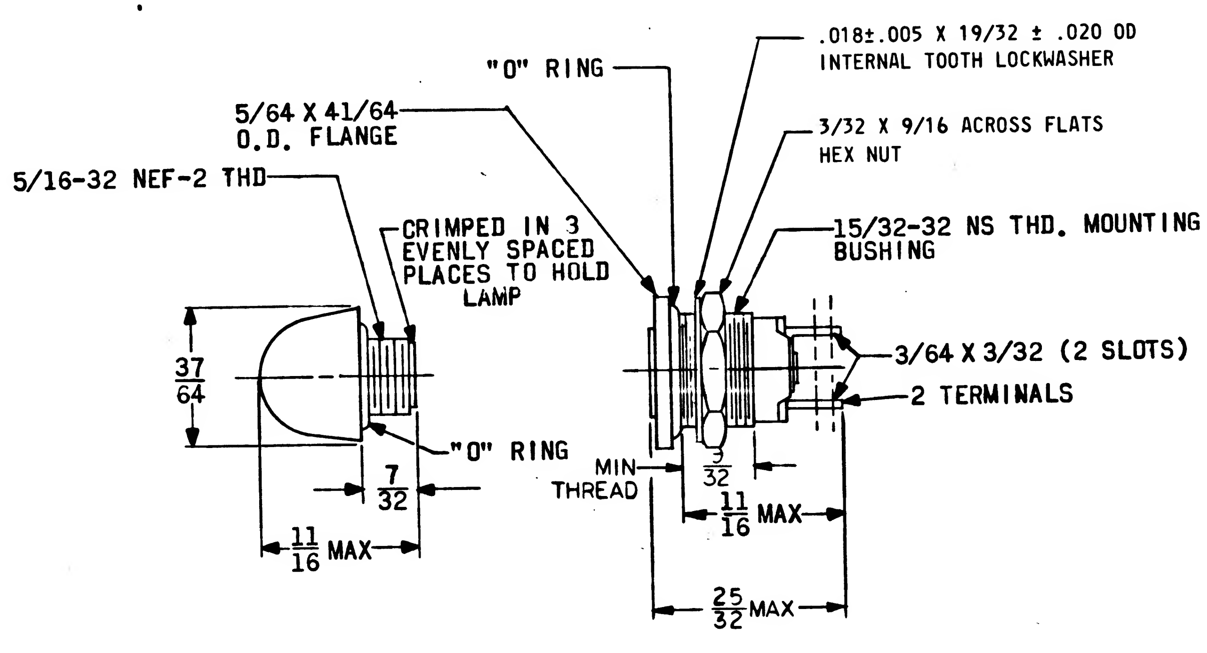
1. GENERAL:
   - A INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - C UNITS SHALL MEET ALL REQUIREMENTS SPECIFIED IN ND 1002056 UNLESS MODIFIED OR AMENDED BY REQUIREMENTS OF THIS DRAWING.
   - D UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-L-3661/5.

2. INSPECTION AND ACCEPTANCE:
   - A MECHANICAL REQUIREMENTS:
     - 1 MARKING: THE FOLLOWING SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART:
       - (a) NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER
       - (b) MANUFACTURER'S NAME OR TRADEMARK
       - (c) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE
     - 2 LAMP REQUIREMENT: UNIT SHALL ACCOMMODATE ANY LAMP WITH A MIDGET FLANGE BASE, T-1-3/4 BULB. (LAMP WILL NOT BE FURNISHED WITH THIS UNIT)
     - 3 TERMINAL STRENGTH: 2 POUNDS MINIMUM PULL APPLIED IN BOTH AN AXIAL AND RADIAL DIRECTION.
   - B ELECTRICAL REQUIREMENTS:
     - 1 DIELECTRIC STRENGTH: THERE SHALL BE NO BREAKDOWN, DAMAGE FLASHOVER, OR ARCING WHEN VOLTAGE AS FOLLOWS IS APPLIED BETWEEN THE SPECIFIED POINTS FOR FIVE (5) SECONDS:
       - (a) SEA LEVEL: AT SEA LEVEL 1000 VOLTS RMS, 60 CPS SHALL BE APPLIED BETWEEN MUTUALLY INSULATED PORTIONS, AND BETWEEN EACH INSULATED PORTION AND GROUND OR FRAME.
     - 2 CONTACT RESISTANCE: CONTACT RESISTANCE SHALL BE MEASURED BETWEEN TWO TERMINALS WITH TEST PLUG INSTALLED IN ACCORDANCE WITH METHOD 307 OF MIL-STD-202. TEST CURRENT SHALL BE 1.0 AMPERE ± 5 PERCENT. CONTACT RESISTANCE SHALL BE NOT MORE THAN 1.0 OHM.

3. DESIGN REQUIREMENTS:
   - A MATERIALS AND FINISHES:
     - 1 MOUNTING BUSHING: ALUMINUM, BLACK ANODIZE FINISH
     - 2 MOUNTING NUT: CRES PER QQ-S-763 (303SE), CONDITION A. PASSIVATE PER MIL-F-14072, E300
       INTERNAL TOOTH LOCKWASHER: CRES PER FED. STD. 66 NO. 410. PASSIVATE PER MIL-F-14072, E300
     - 3 TERMINALS: BRASS, HOT TINNED
     - 4 LENS: ACETATE BUT YRATE PER FED-L-P-349.
     - 5 INSULATING WASHERS: GLASS BASE EPOXY TYPE GEE, PER MIL-P-18177

A	A
—	—
SHEET 1	SHEET 2

REVISION STATUS OF SHEETS



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±1/64 DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES

HEAT TREATMENT NONE

FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS9-497

DRAWN R.W. Turner DATE 14 JUNE 63
CHECKED Wilson 17 June 63
APPROVAL J.T. Kerins 8/1/63
APPROVAL —

NASA APPROVAL 8/7/63

MIT APPROVAL W. Kupfer Xmy 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LIGHT, INDICATOR
(SUB-MINIATURE)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010625
SCALE NONE
WT
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010625 A

REVISIONS 02474

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A		WK
A	REVISED PER TDRR 03504	10-1-63	WK

4 DESIGN REQUIREMENTS (CONTINUED):

- A PANEL THICKNESS (MAXIMUM): 3/16
- B ENVIRONMENTAL REQUIREMENTS:
  - 1 VIBRATION: 5-2000 CPS, 15 G
  - 2 SHOCK:
    - a OPERATING: 15 G, 6 MILLISECONDS
    - b NON-OPERATING: 78 G, 11 MILLISECONDS
  - 3 TEMPERATURE:
    - a OPERATING: 0 TO +165°F
    - b NON OPERATING: -65°F TO +165°F
  - 4 ACCELERATION: 20 G
  - 5 OXYGEN ATMOSPHERE: THIS UNIT SHALL BE CAPABLE OF OPERATING IN AN AMBIENT ATMOSPHERE OF 100% OXYGEN AT PRESSURES VARYING FROM 10^{-4} MILLIMETERS OF MERCURY TO 15 PSIA AND TEMPERATURES VARYING FROM -65°F TO +165°F. DURING THIS EXPOSURE NONE OF THE FOLLOWING SHALL OCCUR:
    - a EXPLOSION
    - b ARCING SUFFICIENT TO CREATE OZONE (O_3)
    - c TOXIC OR CORROSIVE OUTGASING OF MATERIALS
  - 6 HIGH ALTITUDE: THIS UNIT SHALL BE CAPABLE OF OPERATING AT PRESSURES VARYING FROM 10^{-4} MILLIMETERS OF MERCURY TO 15 PSIA. AT ANY PRESSURE IN THIS RANGE THE UNIT SHALL BE CAPABLE OF MEETING THE DIELECTRIC STRENGTH REQUIREMENT AS LISTED IN THE INSPECTION AND ACCEPTANCE SECTION OF THIS DRAWING, EXCEPT THE APPLIED POTENTIAL SHALL BE 300 VOLTS RMS, 60 CPS.
  - 7 HUMIDITY: 95%, 49°C FOR 5 CYCLES.
  - SALT SPRAY: 20% FOR 50 HOURS.
- C CONTACT-SPRING PRESSURE: CONTACT-SPRING PRESSURE, WITH LAMP OR TEST PLUG INSTALLED, SHALL BE SUFFICIENT TO PREVENT ANY ARCING CONDITIONS WHEN SUBJECTED TO ANY COMBINATION OF THE SHOCK, VIBRATION AND OXYGEN ATMOSPHERE REQUIREMENTS OF THIS DRAWING.

TABLE I

NASA DASH NUMBER	LENS COLOR
1010625-1	CLEAR TRANSPARENT

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS9-497
DRAWN R.W. Turner DATE 14 JUNE 63
CHECKED Wilson 17 June 63
APPROVAL [illegible] 8/1/63
APPROVAL
NASA APPROVAL [illegible] 8/7/63
MIT APPROVAL W Kupfer 7 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LIGHT, INDICATOR
(SUB-MINIATURE)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010625
SCALE
WT
SHEET 2 OF 2

1010625 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 02474			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A	[illegible] 63	[illegible]
A	REVISED PER TDRR 03504	10-1-63	[illegible]
B	REVISED PER TDRR 10041	[illegible] 64	[illegible]

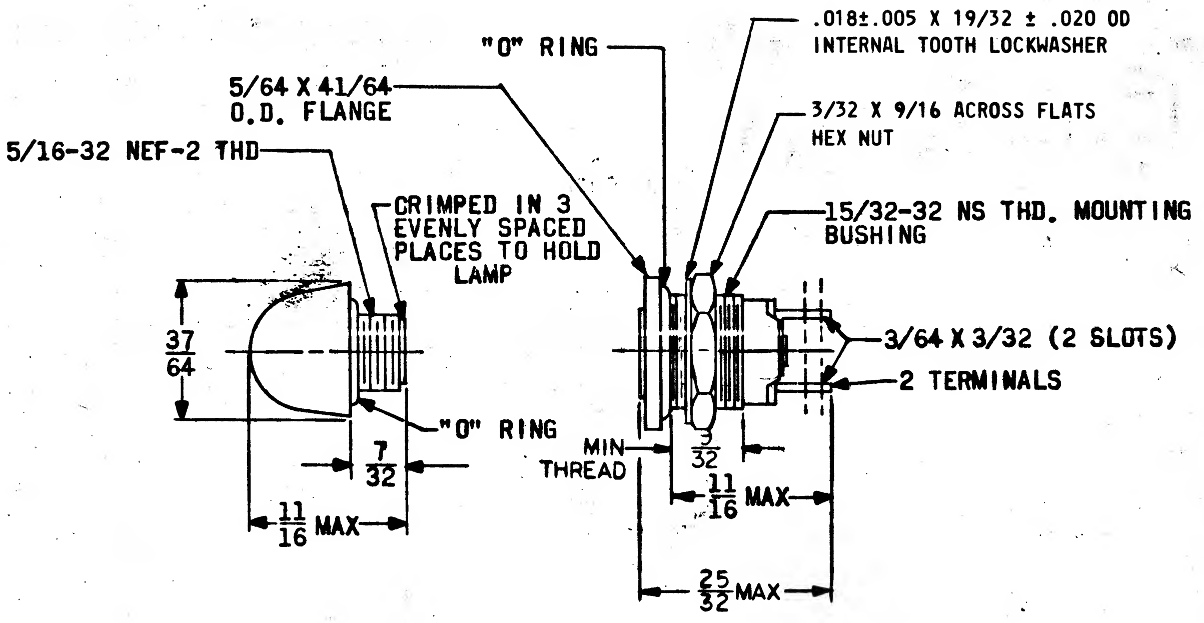
REQUIREMENTS:

1. GENERAL:
   - A INTERPRET DRAWING IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED BY MIL-D-70327.
   - B SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3 .
   - C UNITS SHALL MEET ALL REQUIREMENTS SPECIFIED IN ND 1002056 UNLESS MODIFIED OR AMENDED BY REQUIREMENTS OF THIS DRAWING.
   - D UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-L- 3661/5.

2. INSPECTION AND ACCEPTANCE:
   - A MECHANICAL REQUIREMENTS:
     - 1 MARKING: THE FOLLOWING SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART:
       - (a) NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER
       - (b) MANUFACTURER'S NAME OR TRADEMARK
       - (c) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE
     - 2 LAMP REQUIREMENT: UNIT SHALL ACCOMMODATE ANY LAMP WITH A MIDGET FLANGE BASE, T-1-3/4 BULB. (LAMP WILL NOT BE FURNISHED WITH THIS UNIT)
     - 3 TERMINAL STRENGTH: 2 POUNDS MINIMUM PULL APPLIED IN BOTH AN AXIAL AND RADIAL DIRECTION.
   - B ELECTRICAL REQUIREMENTS:
     - 1 DIELECTRIC STRENGTH: THERE SHALL BE NO BREAKDOWN, DAMAGE FLASHOVER, OR ARCING WHEN VOLTAGE AS FOLLOWS IS APPLIED BETWEEN THE SPECIFIED POINTS FOR FIVE (5) SECONDS:
       - (a) SEA LEVEL: AT SEA LEVEL 1000 VOLTS RMS, 60 CPS SHALL BE APPLIED BETWEEN MUTUALLY INSULATED PORTIONS, AND BETWEEN EACH INSULATED PORTION AND GROUND OR FRAME.
     - 2 CONTACT RESISTANCE: CONTACT RESISTANCE SHALL BE MEASURED BETWEEN TWO TERMINALS WITH TEST PLUG INSTALLED IN ACCORDANCE WITH METHOD 307 OF MIL-STD-202. TEST CURRENT SHALL BE 1.0 AMPERE ± 5 PERCENT. CONTACT RESISTANCE SHALL BE NOT MORE THAN 1.0 OHM.

3. DESIGN REQUIREMENTS:
   - A MATERIALS AND FINISHES:
     - 1 MOUNTING BUSHING: ALUMINUM, BLACK ANODIZE FINISH
     - 2 MOUNTING NUT: CRES PER QQ-S-763 (303SE), CONDITION A. PASSIVATE PER MIL-F-14072, E300
       INTERNAL TOOTH LOCKWASHER: CRES PER FED. STD. 66 NO. 410. PASSIVATE PER MIL-F-14072, E300
     - 3 TERMINALS: BRASS, HOT TINNED
     - 4 LENS: ACETATE BUTYRATE PER FED SPEC L-P-349.
     - 5 INSULATING WASHERS: GLASS BASE EPOXY TYPE GEE, PER MIL-P-18177
     - 6 "O" RINGS: SILICON RUBBER PER AMS 3345.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO CONTRACT NAS9-497
DRAWN R.W. [illegible] DATE 14 JUNE 63
CHECKED [illegible] 17 June 63
APPROVAL [illegible] 8/1/63
APPROVAL
NASA APPROVAL [illegible] 8/7/63
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LIGHT, INDICATOR
(SUB-MINIATURE)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010625
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

B	1010625

REVISIONS 02474			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A		WR
A	REVISED PER TDRR 03504	10-1-63	WK
B	REVISED PER TDRR 10041	6/9/64	WK

D

4 DESIGN REQUIREMENTS (CONTINUED):

A PANEL THICKNESS (MAXIMUM): 3/16

B ENVIRONMENTAL REQUIREMENTS:

1 VIBRATION: 5-2000 CPS, 15 G

2 SHOCK:

a OPERATING: 15 G, 6 MILLISECONDS

b NON-OPERATING: 78 G, 11 MILLISECONDS

3 TEMPERATURE:

a OPERATING: 0 TO +165°F

b NON OPERATING: -65°F TO +165°F

4 ACCELERATION: 20 G

5 OXYGEN ATMOSPHERE: THIS UNIT SHALL BE CAPABLE OF OPERATING IN AN AMBIENT ATMOSPHERE OF 100% OXYGEN AT PRESSURES VARYING FROM 10^{-4} MILLIMETERS OF MERCURY TO 15 PSIA AND TEMPERATURES VARYING FROM -65°F TO +165°F. DURING THIS EXPOSURE NONE OF THE FOLLOWING SHALL OCCUR:

a EXPLOSION

b ARCING SUFFICIENT TO CREATE O ZONE (O_3)

c TOXIC OR CORROSIVE OUTGASING OF MATERIALS

6 HIGH ALTITUDE: THIS UNIT SHALL BE CAPABLE OF OPERATING AT PRESSURES VARYING FROM 10^{-4} MILLIMETERS OF MERCURY TO 15 PSIA. AT ANY PRESSURE IN THIS RANGE THE UNIT SHALL BE CAPABLE OF MEETING THE DIELECTRIC STRENGTH REQUIREMENT AS LISTED IN THE INSPECTION AND ACCEPTANCE SECTION OF THIS DRAWING, EXCEPT THE APPLIED POTENTIAL SHALL BE 300 VOLTS RMS, 60 CPS.

7 HUMIDITY: 95%, 49°C FOR 5 CYCLES.

SALT SPRAY: 20% FOR 50 HOURS.

C CONTACT-SPRING PRESSURE: CONTACT-SPRING PRESSURE, WITH LAMP OR TEST PLUG INSTALLED, SHALL BE SUFFICIENT TO PREVENT ANY ARCING CONDITIONS WHEN SUBJECTED TO ANY COMBINATION OF THE SHOCK, VIBRATION AND OXYGEN ATMOSPHERE REQUIREMENTS OF THIS DRAWING.

TABLE I

NASA DASH NUMBER	LENS COLOR
1010625-1	CLEAR TRANSPARENT

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO.
CONTRACT NAS9-497
DRAWN R.W. Jurgens DATE 14 JUNE 63
CHECKED 17 June 63
APPROVAL 8/1/63
APPROVAL
NASA APPROVAL 8/7/63
MIT APPROVAL W Kupfer 7 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LIGHT, INDICATOR
(SUB-MINIATURE)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO
SIZE C
NASA DRAWING NO. 1010625
SCALE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

C 1010625

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS 02474			
-	INITIAL RELEASE CLASS A	Aug 63	WK
A	REVISED PER TDRR 03504	10-1-63	WK
B	REVISED PER TDRR 10041	6/9/64	WK
C	REVISED PER TDRR 20993	8/17/65	WK

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

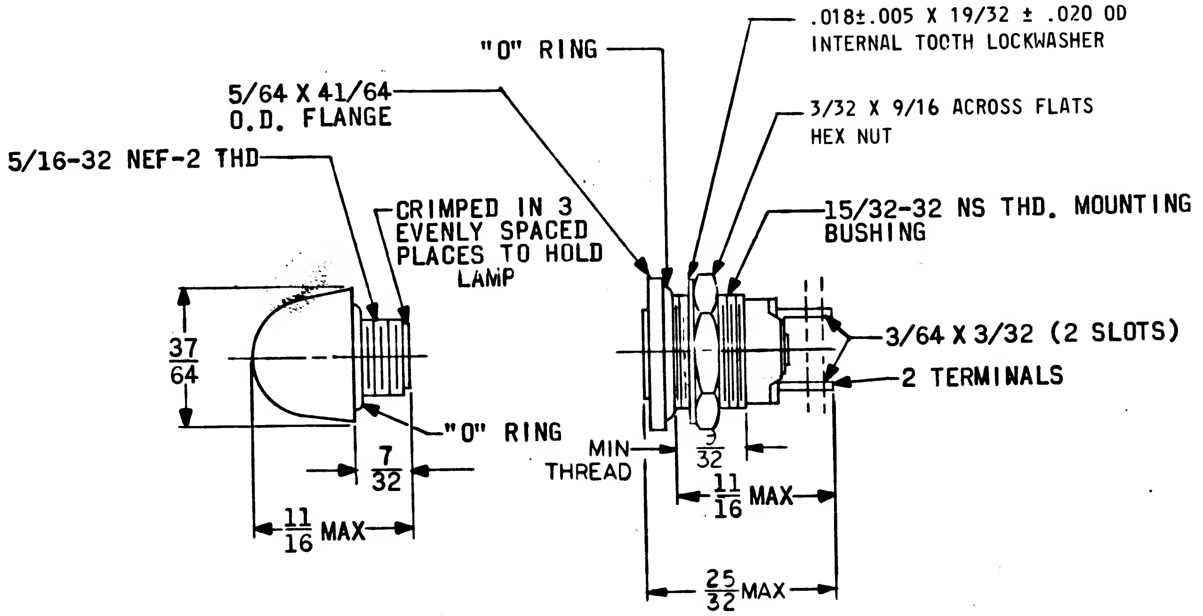
REQUIREMENTS:

1. GENERAL:
   - A INTERPRET DRAWING, IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED BY MIL-D-70327.
   - B SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3 .
   - C UNITS SHALL MEET ALL REQUIREMENTS SPECIFIED IN ND 1002056 UNLESS MODIFIED OR AMENDED BY REQUIREMENTS OF THIS DRAWING.
   - D UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-L- 3661/5.

2. INSPECTION AND ACCEPTANCE:
   - A MECHANICAL REQUIREMENTS:
     - 1 MARKING: THE FOLLOWING SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART:
       - (a) NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER
       - (b) MANUFACTURER'S NAME OR TRADEMARK
       - (c) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE
     - 2 LAMP REQUIREMENT: UNIT SHALL ACCOMMODATE ANY LAMP WITH A MIDGET FLANGE BASE, T-1-3/4 BULB. (LAMP WILL NOT BE FURNISHED WITH THIS UNIT)
     - 3 TERMINAL STRENGTH: 2 POUNDS MINIMUM PULL APPLIED IN BOTH AN AXIAL AND RADIAL DIRECTION.
   - B ELECTRICAL REQUIREMENTS:
     - 1 DIELECTRIC STRENGTH: THERE SHALL BE NO BREAKDOWN, DAMAGE FLASHOVER, OR ARCING WHEN VOLTAGE AS FOLLOWS IS APPLIED BETWEEN THE SPECIFIED POINTS FOR FIVE (5) SECONDS:
       - (a) SEA LEVEL: AT SEA LEVEL 1000 VOLTS RMS, 60 CPS SHALL BE APPLIED BETWEEN MUTUALLY INSULATED PORTIONS, AND BETWEEN EACH INSULATED PORTION AND GROUND OR FRAME.
     - 2 CONTACT RESISTANCE: CONTACT RESISTANCE SHALL BE MEASURED BETWEEN TWO TERMINALS WITH TEST PLUG INSTALLED IN ACCORDANCE WITH METHOD 307 OF MIL-STD-202. TEST CURRENT SHALL BE 1.0 AMPERE ± 5 PERCENT. CONTACT RESISTANCE SHALL BE NOT MORE THAN 1.0 OHM.

3. DESIGN REQUIREMENTS:
   - A MATERIALS AND FINISHES:
     - 1 MOUNTING BUSHING: ALUMINUM, BLACK ANODIZE FINISH
     - 2 MOUNTING NUT: CRES PER QQ-S-763 (303SE), CONDITION A. PASSIVATE PER MIL-F-14072, E300
       INTERNAL TOOTH LOCKWASHER: CRES PER FED. STD. 66 NO. 410. PASSIVATE PER MIL-F-14072, E300
     - 3 TERMINALS: BRASS. HOT TINNED
     - 4 LENS: ACETATE BUTYRATE PER FED SPEC L-P-349.
     - 5 INSULATING WASHERS: GLASS BASE EPOXY TYPE GEE, PER MIL-P-18177
     - 6 "O" RINGS: SILICON RUBBER PER AMS 3345.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.


"O" RING
.018±.005 X 19/32 ± .020 OD INTERNAL TOOTH LOCKWASHER
5/64 X 41/64 O.D. FLANGE
3/32 X 9/16 ACROSS FLATS HEX NUT
5/16-32 NEF-2 THD
CRIMPED IN 3 EVENLY SPACED PLACES TO HOLD LAMP
15/32-32 NS THD. MOUNTING BUSHING
3/64 X 3/32 (2 SLOTS)
2 TERMINALS
37/64
"O" RING
7/32
11/16 MAX
MIN THREAD
3/32
11/16 MAX
25/32 MAX

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS9-497
DRAWN R.W. Turner DATE 14 JUNE 63
CHECKED Wilson 17 June 63
APPROVAL 8/1/63
APPROVAL —
NASA APPROVAL 8/7/63
MIT APPROVAL W Kupfer 7 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LIGHT, INDICATOR
(SUB-MINIATURE)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010625
SCALE NONE
WT
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 02474

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A		NR
A	REVISED PER TDRR 03504	10-1-63	WK
B	REVISED PER TDRR 10041	1/9/64	WK
C	REVISED PER TDRR 20993	8/17/65	WK

4 DESIGN REQUIREMENTS (CONTINUED):

A PANEL THICKNESS (MAXIMUM): 3/16

B ENVIRONMENTAL REQUIREMENTS:

1 VIBRATION: 5-2000 CPS, 15 G

2 SHOCK:

a OPERATING: 15 G, 6 MILLISECONDS

b NON-OPERATING: 78 G, 11 MILLISECONDS

3 TEMPERATURE:

a OPERATING: 0 TO +165°F

b NON OPERATING: -65°F TO +165°F

4 ACCELERATION: 20 G

5 OXYGEN ATMOSPHERE: THIS UNIT SHALL BE CAPABLE OF OPERATING IN AN AMBIENT ATMOSPHERE OF 100% OXYGEN AT PRESSURES VARYING FROM 10^{-4} MILLIMETERS OF MERCURY TO 15 PSIA AND TEMPERATURES VARYING FROM -65°F TO +165°F. DURING THIS EXPOSURE NONE OF THE FOLLOWING SHALL OCCUR:

a EXPLOSION

b ARCING SUFFICIENT TO CREATE O ~~Z~~ONE (O_3)

c TOXIC OR CORROSIVE OUTGASING OF MATERIALS

6 HIGH ALTITUDE: THIS UNIT SHALL BE CAPABLE OF OPERATING AT PRESSURES VARYING FROM 10^{-4} MILLIMETERS OF MERCURY TO 15 PSIA. AT ANY PRESSURE IN THIS RANGE THE UNIT SHALL BE CAPABLE OF MEETING THE DIELECTRIC STRENGTH REQUIREMENT AS LISTED IN THE INSPECTION AND ACCEPTANCE SECTION OF THIS DRAWING, EXCEPT THE APPLIED POTENTIAL SHALL BE 300 VOLTS RMS, 60 CPS.

7 HUMIDITY: 95%, 49°C FOR 5 CYCLES.

SALT SPRAY: 20% FOR 50 HOURS.

C CONTACT-SPRING PRESSURE: CONTACT-SPRING PRESSURE, WITH LAMP OR TEST PLUG INSTALLED, SHALL BE SUFFICIENT TO PREVENT ANY ARCING CONDITIONS WHEN SUBJECTED TO ANY COMBINATION OF THE SHOCK, VIBRATION AND OXYGEN ATMOSPHERE REQUIREMENTS OF THIS DRAWING.

TABLE I

NASA DASH NUMBER	LENS COLOR
1010625-1	CLEAR TRANSPARENT
1010625-2	WHITE TRANSLUCENT

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS9-497

DRAWN R.W. Turner DATE 14 JUNE 63
CHECKED Wilson 17 June 63
APPROVAL 8/1/63
APPROVAL
NASA APPROVAL 8/7/63
MIT APPROVAL 7 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LIGHT, INDICATOR
(SUB-MINIATURE)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010625
SCALE
WT
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

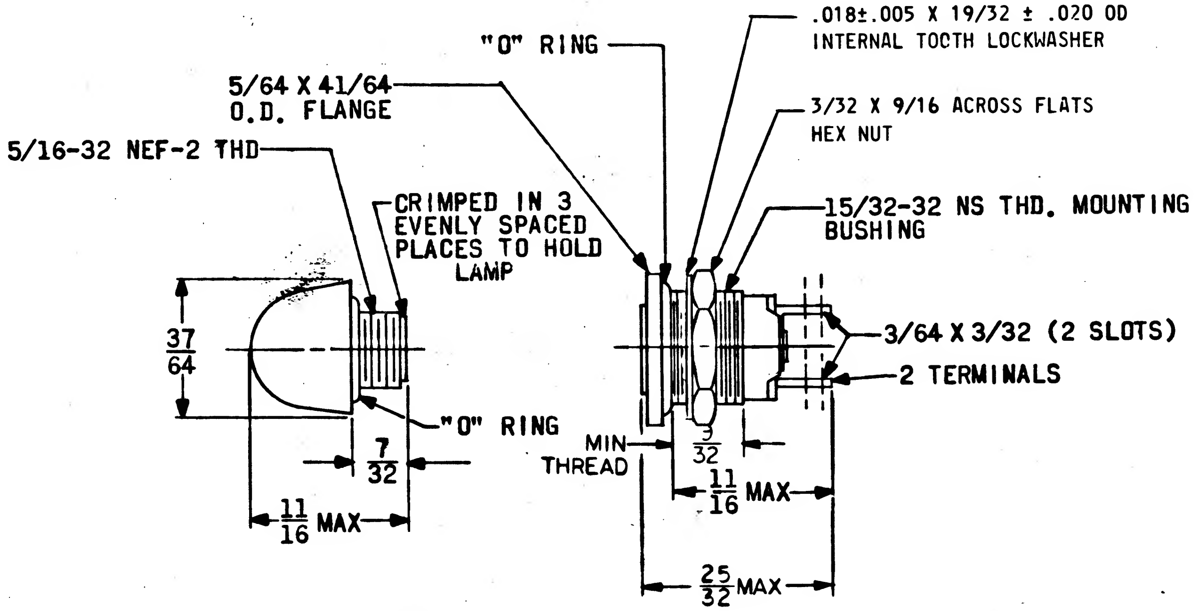
REVISIONS 02474			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A	[illegible] 63	WK
A	REVISED PER TDRR 03504	10-1-63	WK
B	REVISED PER TDRR 10041	1/9/64	WK
C	REVISED PER TDRR 20993	8/17/65	WK
D	REVISED PER TDRR 27357	3/25/66	WK

REQUIREMENTS:

1. GENERAL:
   - A INTERPRET DRAWING IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED BY MIL-D-70327.
   - B SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3 .
   - C UNITS SHALL MEET ALL REQUIREMENTS SPECIFIED IN ND 1002056 UNLESS MODIFIED OR AMENDED BY REQUIREMENTS OF THIS DRAWING.
   - D UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-L- 3661/5.

2. INSPECTION AND ACCEPTANCE:
   - A MECHANICAL REQUIREMENTS:
     - 1 MARKING: MANUFACTURES NAME OR TRADEMARK AND PART NO. AND NASA PART NO. AND REV. LETTER SHALL APPEAR ON THE PACKAGE
     - 2 LAMP REQUIREMENT: UNIT SHALL ACCOMMODATE ANY LAMP WITH A MIDGET FLANGE BASE, T-1-3/4 BULB. (LAMP WILL NOT BE FURNISHED WITH THIS UNIT)
     - 3 TERMINAL STRENGTH: 2 POUNDS MINIMUM PULL APPLIED IN BOTH AN AXIAL AND RADIAL DIRECTION.
   - B ELECTRICAL REQUIREMENTS:
     - 1 DIELECTRIC STRENGTH: THERE SHALL BE NO BREAKDOWN, DAMAGE FLASHOVER, OR ARCING WHEN VOLTAGE AS FOLLOWS IS APPLIED BETWEEN THE SPECIFIED POINTS FOR FIVE (5) SECONDS:
       - (a) SEA LEVEL: AT SEA LEVEL 600 VOLTS RMS, 60 CPS SHALL BE APPLIED BETWEEN MUTUALLY INSULATED PORTIONS, AND BETWEEN EACH INSULATED PORTION AND GROUND OR FRAME.
     - 2 CONTACT RESISTANCE: CONTACT RESISTANCE SHALL BE MEASURED BETWEEN TWO TERMINALS WITH TEST PLUG INSTALLED IN ACCORDANCE WITH METHOD 307 OF MIL-STD-202. TEST CURRENT SHALL BE 1.0 AMPERE ± 5 PERCENT. CONTACT RESISTANCE SHALL BE NOT MORE THAN 1.0 OHM.

3. DESIGN REQUIREMENTS:
   - A MATERIALS AND FINISHES:
     - 1 MOUNTING BUSHING: ALUMINUM, BLACK ANODIZE FINISH
     - 2 MOUNTING NUT: CRES PER QQ-S-763 (303SE), CONDITION A. PASSIVATE PER MIL-F-14072, E300
       INTERNAL TOOTH LOCKWASHER: CRES PER FED. STD. 66 NO. 410. PASSIVATE PER MIL-F-14072, E300
     - 3 TERMINALS: BRASS, HOT TINNED
     - 4 LENS: ACETATE BUTYRATE PER FED SPEC L-P-349.
     - 5 INSULATING WASHERS: GLASS BASE EPOXY TYPE GEE, PER MIL-P-18177
     - 6 "O" RINGS: SILICON RUBBER PER AMS 3345.



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS9-497

DRAWN R.W. Turner DATE 14 JUNE 63
CHECKED Wilson 17 June 63
APPROVAL J. Klein 8/1/63
APPROVAL —
NASA APPROVAL 8/7/66
MIT APPROVAL W. Kupfer [illegible] 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LIGHT, INDICATOR
(SUB-MINIATURE)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	1010625
SCALE NONE	WT	SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 02474			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A		
A	REVISED PER TDRR 03504	10-1-63	WK
B	REVISED PER TDRR 10041	10/9/64	WK
C	REVISED PER TDRR 20993	8/17/65	WK
D	REVISED PER TDRR 27357	3/24/66	WK

4 DESIGN REQUIREMENTS (CONTINUED):

A PANEL THICKNESS (MAXIMUM): 3/16

B ENVIRONMENTAL REQUIREMENTS:

1 VIBRATION: 5-2000 CPS, 15 G

2 SHOCK:

a OPERATING: 15 G, 6 MILLISECONDS

b NON-OPERATING: 78 G, 11 MILLISECONDS

3 TEMPERATURE:

a OPERATING: 0 TO +165°F

b NON OPERATING: -65°F TO +165°F

4 ACCELERATION: 20 G

5 OXYGEN ATMOSPHERE: THIS UNIT SHALL BE CAPABLE OF OPERATING IN AN AMBIENT ATMOSPHERE OF 100% OXYGEN AT PRESSURES VARYING FROM 10^{-4} MILLIMETERS OF MERCURY TO 15 PSIA AND TEMPERATURES VARYING FROM -65°F TO +165°F. DURING THIS EXPOSURE NONE OF THE FOLLOWING SHALL OCCUR:

a EXPLOSION

b ARCING SUFFICIENT TO CREATE O ZONE (O_3)

c TOXIC OR CORROSIVE OUTGASING OF MATERIALS

6 HIGH ALTITUDE: THIS UNIT SHALL BE CAPABLE OF OPERATING AT PRESSURES VARYING FROM 10^{-4} MILLIMETERS OF MERCURY TO 15 PSIA. AT ANY PRESSURE IN THIS RANGE THE UNIT SHALL BE CAPABLE OF MEETING THE DIELECTRIC STRENGTH REQUIREMENT AS LISTED IN THE INSPECTION AND ACCEPTANCE SECTION OF THIS DRAWING, EXCEPT THE APPLIED POTENTIAL SHALL BE 300 VOLTS RMS, 60 CPS.

7 HUMIDITY: 95%, 49°C FOR 5 CYCLES.

SALT SPRAY: 20% FOR 50 HOURS.

C CONTACT-SPRING PRESSURE: CONTACT-SPRING PRESSURE, WITH LAMP OR TEST PLUG INSTALLED, SHALL BE SUFFICIENT TO PREVENT ANY ARCING CONDITIONS WHEN SUBJECTED TO ANY COMBINATION OF THE SHOCK, VIBRATION AND OXYGEN ATMOSPHERE REQUIREMENTS OF THIS DRAWING.

TABLE I

NASA DASH NUMBER	LENS COLOR
1010625-1	CLEAR TRANSPARENT
1010625-2	WHITE TRANSLUCENT

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS9-497

DRAWN R.W. Turner DATE 14 JUNE 63
CHECKED Wilson 17 June 63
APPROVAL 9/1/63
APPROVAL
NASA APPROVAL 8/7/63
MIT APPROVAL W Kupfer 7 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LIGHT, INDICATOR
(SUB-MINIATURE)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010625
SCALE
WT
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

—	1010625

REVISIONS 02474			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A	Aug63	

REQUIREMENTS:

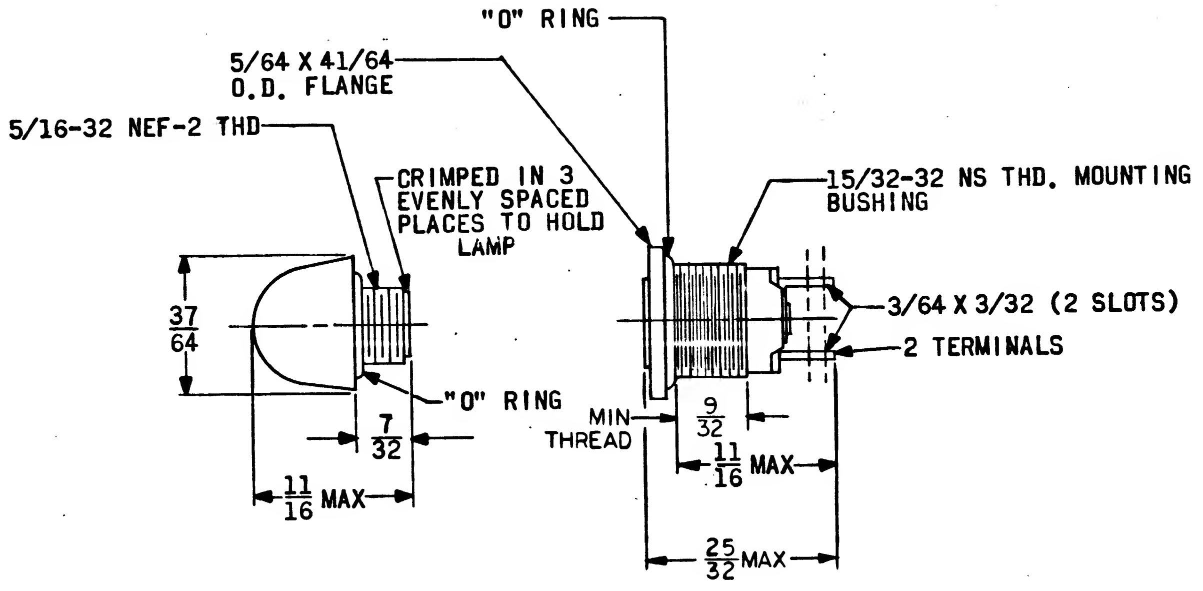
GENERAL:
- INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
- SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
- UNITS SHALL MEET ALL REQUIREMENTS SPECIFIED IN ND 1002056 UNLESS MODIFIED OR AMENDED BY REQUIREMENTS OF THIS DRAWING.
- UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-L- 3661/5.

INSPECTION AND ACCEPTANCE: (SAMPLE)
- MECHANICAL REQUIREMENTS:
  - MARKING: THE FOLLOWING SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART:
    - NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER
    - MANUFACTURER'S NAME OR TRADEMARK
    - MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE
  - LAMP REQUIREMENT: UNIT SHALL ACCOMMODATE ANY LAMP WITH A MIDGET FLANGE BASE, T-1-3/4 BULB. (LAMP WILL NOT BE FURNISHED WITH THIS UNIT)
  - TERMINAL STRENGTH: 2 POUNDS MINIMUM PULL APPLIED IN BOTH AN AXIAL AND RADIAL DIRECTION.
- ELECTRICAL REQUIREMENTS:
  - DIELECTRIC STRENGTH: THERE SHALL BE NO BREAKDOWN, DAMAGE FLASHOVER, OR ARCING WHEN VOLTAGE AS FOLLOWS IS APPLIED BETWEEN THE SPECIFIED POINTS FOR FIVE (5) SECONDS:
    - SEA LEVEL: AT SEA LEVEL 1000 VOLTS RMS, 60 CPS SHALL BE APPLIED BETWEEN MUTUALLY INSULATED PORTIONS, AND BETWEEN EACH INSULATED PORTION AND GROUND OR FRAME.
  - CONTACT RESISTANCE: CONTACT RESISTANCE SHALL BE MEASURED BETWEEN TWO TERMINALS WITH TEST PLUG INSTALLED IN ACCORDANCE WITH METHOD 307 OF MIL-STD-202. TEST CURRENT SHALL BE 1.0 AMPERE ± 5 PERCENT. CONTACT RESISTANCE SHALL BE NOT MORE THAN 0.05 OHM.

DESIGN REQUIREMENTS:
- MATERIALS AND FINISHES:
  - MOUNTING BUSHING: ALUMINUM, BLACK ANODIZE FINISH
  - TERMINALS: BRASS, HOT TINNED
  - LENS: ACETATE BUTLYRATE PER FED-L-D-349.
  - INSULATING WASHERS: TO BE DETERMINED

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

—	—
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

M I T INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS9-497
DRAWN R.W. Turner DATE 14 JUNE 63
CHECKED Wilson 17 June 63
APPROVAL 8/1/63
APPROVAL —
NASA APPROVAL 8/7/63
MIT APPROVAL 7 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LIGHT, INDICATOR
(SUB-MINIATURE)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.	
	C	1010625	
SCALE NONE	WT		SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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— 1010625

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS 02474			
-	INITIAL RELEASE CLASS A		NR

DESIGN REQUIREMENTS (CONTINUED):

- PANEL THICKNESS (MAXIMUM): 3/16
- ENVIRONMENTAL REQUIREMENTS:
  - VIBRATION: 5-2000 CPS, 15 G
  - SHOCK:
    - OPERATING: 15 G, 6 MILLISECONDS
    - NON-OPERATING: 78 G, 11 MILLISECONDS
  - TEMPERATURE:
    - OPERATING: 0 TO +165°F
    - NON OPERATING: -65°F TO +165°F
  - ACCELERATION: 20 G
  - OXYGEN ATMOSPHERE: THIS UNIT SHALL BE CAPABLE OF OPERATING IN AN AMBIENT ATMOSPHERE OF 100% OXYGEN AT PRESSURES VARYING FROM 10^{-4} MILLIMETERS OF MERCURY TO 15 PSIA AND TEMPERATURES VARYING FROM -65°F TO +165°F. DURING THIS EXPOSURE NONE OF THE FOLLOWING SHALL OCCUR:
    - EXPLOSION
    - ARCING SUFFICIENT TO CREATE OZONE (O_3)
    - TOXIC OR CORROSIVE OUTGASING OF MATERIALS
  - HIGH ALTITUDE: THIS UNIT SHALL BE CAPABLE OF OPERATING AT PRESSURES VARYING FROM 10^{-4} MILLIMETERS OF MERCURY TO 15 PSIA. AT ANY PRESSURE IN THIS RANGE THE UNIT SHALL BE CAPABLE OF MEETING THE DIELECTRIC STRENGTH REQUIREMENT AS LISTED IN THE INSPECTION AND ACCEPTANCE SECTION OF THIS DRAWING, EXCEPT THE APPLIED POTENTIAL SHALL BE 300 VOLTS RMS, 60 CPS.
  - HUMIDITY: 95%, 49°C FOR 5 CYCLES.
  - SALT SPRAY: 20% FOR 50 HOURS.
- CONTACT-SPRING PRESSURE: CONTACT-SPRING PRESSURE, WITH LAMP OR TEST PLUG INSTALLED, SHALL BE SUFFICIENT TO PREVENT ANY ARCING CONDITIONS WHEN SUBJECTED TO ANY COMBINATION OF THE SHOCK, VIBRATION AND OXYGEN ATMOSPHERE REQUIREMENTS OF THIS DRAWING.

TABLE I

NASA DASH NUMBER	LENS COLOR	MANUFACTURER'S PART NUMBER (REF)
1010625-1	CLEAR TRANSPARENT	177-8430-937

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
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FINAL FINISH

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DWG NO
CONTRACT NAS9-497
DRAWN DATE 14 JUNE 63
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LIGHT, INDICATOR
(SUB-MINIATURE)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010625
SCALE	WT	SHEET 2 OF 2

1010625

INCHES
0 1 2
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1010627 A

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02742	8/21/63	JW
A	REVISED PER TDRR 10539	6/24/64	WK.

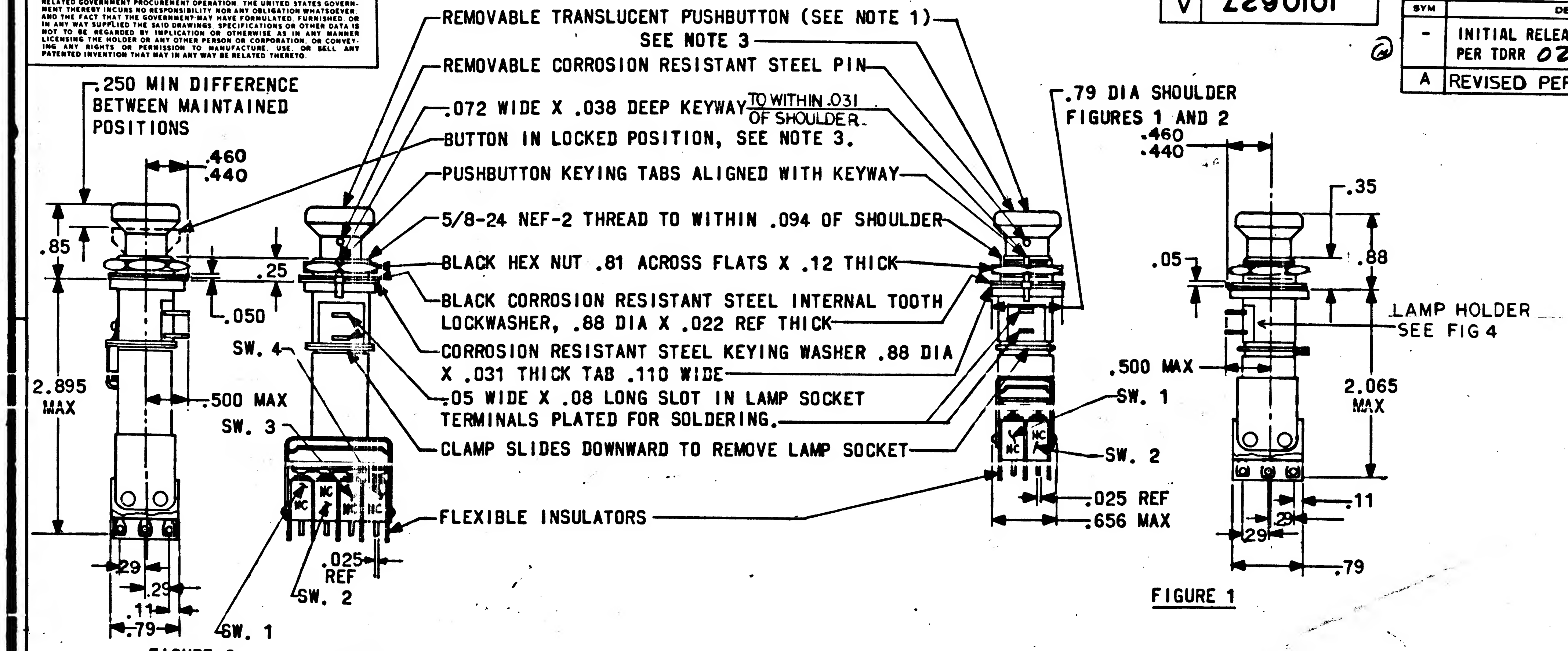
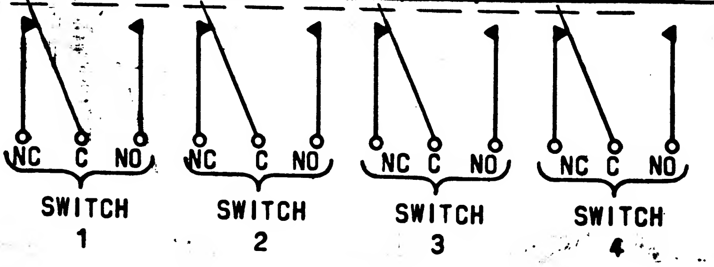

.250 MIN DIFFERENCE BETWEEN MAINTAINED POSITIONS
.460
.440
.85
.25
.050
2.895 MAX
.500 MAX
SW. 4
SW. 3
SW. 2
SW. 1
.025 REF
.29
.29
.11
.79
NC
REMOVABLE TRANSLUCENT PUSHBUTTON (SEE NOTE 1)
SEE NOTE 3
REMOVABLE CORROSION RESISTANT STEEL PIN
.072 WIDE X .038 DEEP KEYWAY TO WITHIN .031 OF SHOULDER
BUTTON IN LOCKED POSITION, SEE NOTE 3.
PUSHBUTTON KEYING TABS ALIGNED WITH KEYWAY
5/8-24 NEF-2 THREAD TO WITHIN .094 OF SHOULDER
BLACK HEX NUT .81 ACROSS FLATS X .12 THICK
BLACK CORROSION RESISTANT STEEL INTERNAL TOOTH LOCKWASHER, .88 DIA X .022 REF THICK
CORROSION RESISTANT STEEL KEYING WASHER .88 DIA X .031 THICK TAB .110 WIDE
.05 WIDE X .08 LONG SLOT IN LAMP SOCKET TERMINALS PLATED FOR SOLDERING.
CLAMP SLIDES DOWNWARD TO REMOVE LAMP SOCKET
FLEXIBLE INSULATORS
.79 DIA SHOULDER FIGURES 1 AND 2
.460
.440
.500 MAX
SW. 1
SW. 2
NC
.025 REF
.656 MAX
.35
.05
.88
LAMP HOLDER SEE FIG 4
2.065 MAX
.11
.29
.29
.79

FIGURE 2

FIGURE 1

TABLE 1

DASH NUMBER	UNIT SWITCHING CIRCUIT	UNIT SWITCHING ACTION		FIGURE NUMBER
-1	2-SPDT	MOMENTARY ACTION		1
-2	4-SPDT	ALTERNATE ACTION		2
-3	(ILLUMINATED BUTTON)	(ILLUMINATED BUTTON)		3
-4	LAMPHOLDER			4



(2 POLE SWITCHES CONSIST OF SWITCHES 1 & 2 ONLY)
SCHEMATIC DIAGRAM (FOR REFERENCE ONLY)

NOTES:

1. PUSH BUTTON (-3) IS NOT SUPPLIED WITH ASSEMBLIES (-1 & -2)
2. SWITCHES DO NOT NECESSARILY OPERATE SIMULTANEOUSLY
3. OPERATING SEQUENCE
   - a. NO TO C CIRCUIT IS MADE WHEN PLUNGER IS IN FREE POSITION.
   - b. NC TO C CIRCUIT IS MADE WHEN PLUNGER IS IN DEPRESSED POSITION.
   - c. ALTERNATE ACTION IS PUSH-ON PUSH-OFF ACTUATION.
4. TOLERANCES-UNLESS OTHERWISE SPECIFIED
   ONE PLACE (.0): ±.030
   TWO PLACE (.00): ±.015
   THREE PLACE (.000): ±.005

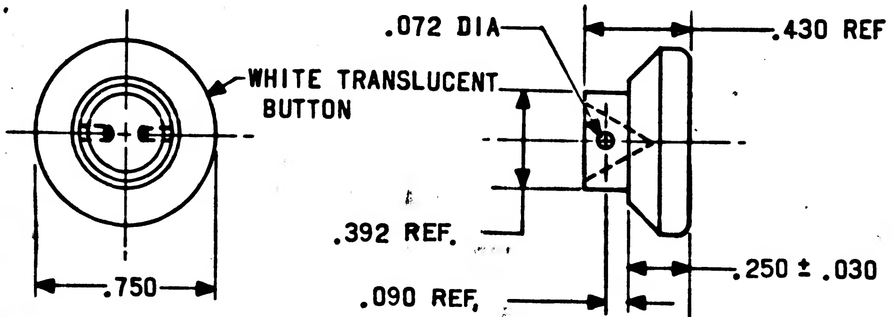


FIGURE 3
(SEE NOTE 1)

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

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TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

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DRAWN R.W. Turner DATE 3 JUL 63
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APPROVAL 8/12/63
APPROVAL
NASA APPROVAL 8/21/63
MIT APPROVAL I Nagel 8/21/63

MANNED SPACECRAFT CENTER
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INDICATOR-LIGHT-SWITCH ASSEMBLY
(HERMETICALLY SEALED SWITCHES)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010627
SCALE NONE
WT
SHEET 1 OF 4

INCHES
0 1 2
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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02742	8/21/63	2u
A	REVISED PER TDRR 10539	6/29/64	wk

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 1.

C. UNITS SHALL MEET ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002055 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING. ALL REQUIREMENTS AS LISTED ON THIS DRAWING SHALL TAKE PRECEDENCE OVER THOSE LISTED IN ND 1002055.

2. INSPECTION AND ACCEPTANCE:

A. MECHANICAL REQUIREMENTS:

(1) MARKING:

(a) PIECEMARKING-PART SHALL BE PERMANENTLY AND LEGIBLY MARKED PER ND1002019 WITH THE NASA PART NUMBER, PLUS DASH NUMBER AND REVISION LETTER. SWITCHES SHALL BE MARKED ON ENDS WITH NC AND C FOR TERMINAL IDENTIFICATION AND BASIC SWITCH NO..

(b) PACKAGE-INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION: SUPPLIER'S NAME, NASA PART NUMBER AND REVISION LETTER, SUPPLIER'S LOT OR SERIAL NUMBER, DATE CODE, OR DATE OF MANUFACTURE.

(C) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

(2) ACTUATING CHARACTERISTICS:

(a) OPERATING FORCE: 70 OZ MAXIMUM.
10 OZ MINIMUM.

(b) TOTAL TRAVEL: 1/8 INCH MINIMUM.

(3) TERMINALS: ALL TERMINALS SHALL BE HOT TIN DIPPED. (40-70% TIN CONTENT), ELECTRO-TIN DEPOSITED OR OTHERWISE PLATED TO FACILITATE SOLDERING.

(4) TERMINAL STRENGTH: 3 POUNDS MINIMUM IN AN AXIAL DIRECTION.

(5) DIMENSIONS: PER FIGURES 1, 2, AND 3.

(6) SEALING: (100% INSPECTION) SWITCHES SHALL BE HERMETICALLY SEALED. THEY SHALL BE EVACUATED, VACUUM BAKED, AND BACK FILLED WITH AN INERT, MOISTURE FREE GAS (I.E. DRY NITROGEN). LEAKAGE FOR EACH BASIC SWITCH SHALL BE LESS THAN 10^{-8} CC/SEC (CONVERTED TO LEAKAGE OF HELIUM). THE PRESSURE DIFFERENTIAL SHALL BE 1 ATMOSPHERE.

(7) LENS ILLUMINATION LEVEL: 4.0 FOOT LAMBERTS MINIMUM WITH 5.75 VOLTS DC APPLIED, WHEN MEASURED WITH A STANDARD CALIBRATED LAMP.

3. ELECTRICAL REQUIREMENTS:

A. DIELECTRIC STRENGTH: THERE SHALL BE NO BREAKDOWN, DAMAGE FLASHOVER, OR ARCING WHEN VOLTAGE AS FOLLOWS IS APPLIED BETWEEN THE MUTUALLY INSULATED SPECIFIED POINTS FOR FIVE (5) SECONDS.

(1) SEA LEVEL: AT SEA-LEVEL, 1000 VOLTS R.M.S. AT 60 CPS SHALL BE APPLIED BETWEEN ADJACENT CURRENT CARRYING PARTS AND GROUND OR FRAME AND ANY TWO ADJACENT TERMINALS.

B. INSULATION RESISTANCE: 100% INSULATION RESISTANCE SHALL BE A MINIMUM OF 1000 MEGOHMS WHEN MEASURED WITH 100 VDC APPLIED FOR A MAXIMUM OF ONE (1) MINUTE BETWEEN TERMINALS AND GROUND OR FRAME AND MUTUALLY INSULATED PARTS.

C. CONTACT RESISTANCE: (100% INSPECTION) SHALL BE MEASURED WITH ONE HUNDRED (100) MILLIAMPERS FROM A TWO (2) VOLT DC OPEN CIRCUIT VOLTAGE. THE CONTACTS SHALL NOT SWITCH THE MEASURING LOAD. LIMITS SHALL BE .5 OHMS MAX INITIALLY.

4. DESIGN REQUIREMENTS:

A. ENVIORNMENTAL REQUIREMENTS: WHEN TESTED AS STATED IN ND 1002055 OR MIL-STD-202 TO THE LEVELS AS STATED BELOW THERE SHALL BE NO DEGRADATION OR UNDESIRABLE EFFECTS AS STATED IN ND 1002055 AND BELOW.

(1) VIBRATION: PER ND 1002055 EXCEPT THE LEVEL SHALL BE 5-2000 CPS AT 12 G 0 TO PEAK - (THE RANGE OF VIBRATION FROM 5-2000 CPS FROM 12 G TO 20 G IS PRESENTLY UNDER EVALUATION. THE DRAWING WILL BE REVISED AT A LATER DATE TO UPGRADE THE VIBRATION REQUIREMENT TO THE UNITS CAPABILITY.) DURING AND AFTER VIBRATION NONE OF THE FOLLOWING CONDITIONS SHALL EXIST.

(a) TRANSFER OF CONTACTS FROM ONE POSITION TO THE OTHER. THIS SHALL NOT EXIST EITHER MOMENTARILY OR PERMANENTLY.

CONTACT CHATTER IN EXCESS OF 10 MICROSECONDS. SEPARATION OF ELECTRICAL CURRENT CARRYING PARTS (I.E. LAMPS AND LAMP SPRINGS) WHICH MAY INTRODUCE ARCING.

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TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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APPROVAL
NASA APPROVAL 9/21/63
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INDICATOR-LIGHT-SWITCH ASSEMBLY
(HERMETICALLY SEALED SWITCHES)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010627
SCALE
WT
SHEET 2 OF 4

INCHES
0 1 2
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ENVIRONMENTAL REQUIREMENTS: VIBRATION (CONTINUED)

(1) MECHANICAL OR ELECTRICAL DEGRADATION WHICH MAY DEGRADE THE PARTS CAPABILITY OF MEETING ANY OTHER ENVIRONMENT LISTED AS WELL AS MORE VIBRATION AND PERFORMING ACCORDING TO ALL FUNCTIONAL REQUIREMENTS AS LISTED IN THE INSPECTION AND ACCEPTANCE SECTION OF THIS SPECIFICATION.

B. SHOCK:

(1) OPERATING: WHEN TESTED TO MIL-STD-810, METHOD 516, PROCEDURE I (EXCEPT THE SHOCK LEVEL SHALL BE 50 G, 11 MILLISECONDS) NONE OF THE CONDITIONS LISTED IN THE VIBRATION SECTION SHALL EXIST.

(2) NON-OPERATING: PER ND 1002055, EXCEPT THE SHOCK INPUT SHALL BE 78 G'S, 11 MILLISECONDS (HALF-SINE WAVE). ALL COMPONENTS OF THE ASSEMBLY SHALL BE RETAINED BY THE ASSEMBLY AND THE ASSEMBLY SHALL BE RETAINED IN ITS MOUNTED POSITION. DEFORMATION OF THE ASSEMBLY AND FAILURE OF THE SWITCH TO OPERATE WILL BE ALLOWED.

5. TEMPERATURE RANGE:

A. OPERATING: 0 TO +165°F.

B. NON-OPERATING: -65°F TO +165°F
DURING AND AFTER SUBJECTION TO THESE TEMPERATURES, MATERIALS SHALL NOT OUTGASS TOXIC OR CORROSIVE GASES NOR SHALL THE UNIT FAIL TO MEET ANY OTHER ENVIRONMENT OR FUNCTIONAL CHARACTERISTIC. THIS REQUIREMENT MAY BE COMBINED WITH THE FOLLOWING OXYGEN ATMOSPHERE REQUIREMENT.

6. OXYGEN ATMOSPHERE: THIS UNIT SHALL BE CAPABLE OF OPERATION IN AN AMBIENT ATMOSPHERE OF 100% OXYGEN AT PRESSURES VARYING FROM 10^{-4} MILLIMETERS OF MERCURY TO 15 PSIA AND TEMPERATURES VARYING FROM -65°F TO +165°F AS STATED ABOVE. DURING THIS EXPOSURE NONE OF THE FOLLOWING SHALL OCCUR.
EXPLOSION.
ARCING SUFFICIENT TO CREATE OZONE (O_3).
TOXIC OR CORROSIVE OUTGASSING OF MATERIALS.

7. HIGH ALTITUDE: THIS UNIT SHALL BE CAPABLE OF OPERATION AT PRESSURES VARYING FROM 10^{-4} MILLIMETERS OF MERCURY TO 15 PSIA. AT ANY PRESSURE IN THIS RANGE THE UNIT SHALL BE CAPABLE OF MEETING THE DIELECTRIC STRENGTH REQUIREMENT AS LISTED IN THE INSPECTION AND ACCEPTANCE SECTION OF THIS DRAWING, EXCEPT THE APPLIED POTENTIAL SHALL BE 300 VRMS, 60 CPS. THIS REQUIREMENT MAY BE COMBINED WITH THE ABOVE OXYGEN ATMOSPHERE REQUIREMENT.

8. DESIGN REQUIREMENTS: (CONTINUED)

A. ACCELERATION: PER ND 1002055 (20 G'S). NONE OF THE CONDITIONS LISTED IN THE VIBRATION SECTION SHALL EXIST.

B. LIFE: THIS UNIT SHALL BE CAPABLE OF 15,000 OPERATIONS MINIMUM OVER THE AMBIENT TEMPERATURE AND PRESSURE RANGE, AT ANY OF THE RATED LOADS. DURING ANY CYCLE OF LIFE THE CONTACT RESISTANCE SHALL NOT EXCEED ONE (1) OHM AND NO MECHANICAL FAILURES SHALL OCCUR. AFTER LIFE THE FOLLOWING FUNCTIONAL PARAMETERS SHALL NOT EXCEED THE VALUES LISTED WHEN CHECKED AS STATED ABOVE.

(1) CONTACT RESISTANCE (.5 OHMS AFTER LIFE WHEN CHECKED AT THE LIFE TEST LOAD)
(2) DIELECTRIC STRENGTH (DERATED TO 500 VRMS, 60 CPS)
(3) INSULATION RESISTANCE
(4) OPERATING FORCE
(5) TOTAL TRAVEL
(6) SEALING

THE ACCUMULATION OF LIFE CYCLES, UP TO THE MINIMUM OF 15,000 SHALL NOT DETERIORATE THE UNITS CAPABILITY OF MEETING THE OTHER ENVIRONMENTS AS SPECIFIED.

C. HUMIDITY: PER ND 1002055

D. MATERIALS AND FINISHES: ALL MATERIALS AND FINISHES USED ON THESE ASSEMBLIES SHALL NOT OUTGAS ANY TOXIC OR CORROSIVE GASES. MATERIALS AND FINISHES USED SHALL NOT CORRODE OR DETERIORATE AS A RESULT OF THE ENVIRONMENTS LISTED OR DURING NORMAL USAGE.

E. LENS MATERIAL: SHALL CONFORM TO "MATERIALS" REQUIREMENT AS STATED ABOVE, SHALL BE WHITE TRANSLUCENT, AND SHALL BE FREE OF INTERNAL AND EXTERNAL CRACKS, SHALL BE FREE OF SURFACE INDENTATIONS VISABLE WITHOUT MAGNIFICATION, SHALL BE CAPABLE OF MEETING ALL THE ENVIRONMENTS LISTED IN THIS DRAWING OR IN ND 1002055 WITHOUT DISTORTION, AND SHALL BE SUITABLE FOR ENGRAVING OF LEGENDS.

F. INDEXING: LENS (BUTTON) SHALL BE EITHER PHYSICALLY CAPTIVE OR INDEXED TO PREVENT INTERCHANGING OF LENS BETWEEN DIFFERENT SWITCHES.

G. LAMPS: UNIT SHALL BE CAPABLE OF RECEIVING ANY LAMP WITH A MINIATURE FLANGE BASE (T-1-3/4) (SIMILAR TO NO. 327 LAMP). (LAMPS ARE NOT SUPPLIED WITH THIS UNIT).

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MIT APPROVAL D Nagel 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INDICATOR-LIGHT-SWITCH ASSEMBLY
(HERMETICALLY SEALED SWITCHES)

SPECIFICATION CONTROL DRAWING

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SIZE C
NASA DRAWING NO. 1010627
SCALE
WT
SHEET 3 OF 4

INCHES
0 1 2
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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
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DESIGN REQUIREMENTS: (CONTINUED)

H. SWITCHING CHARACTERISTICS: (SEE NOTE 2 AND NOTE 3)
INDIVIDUAL SWITCHING CIRCUIT: INDIVIDUAL SWTICHES SHALL BE SPDT - BREAK BEFORE MAKE. (NC-C-NO)
UNIT SWITCHING CIRCUIT: PER TABLE I
UNIT SWITCHING ACTION: PER TABLE I

J. SWITCH CONTACT RATING: (PER POLE)

TYPE LOAD	VOLTAGE	CURRENT (MAX.)
RESISTIVE	28 VOLTS DC	5 AMPERES
INDUCTIVE	28 VOLTS DC	3 AMPERES
LAMP	28 VOLTS DC	1 AMPERE

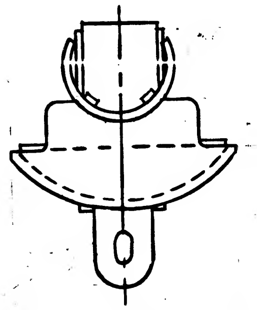
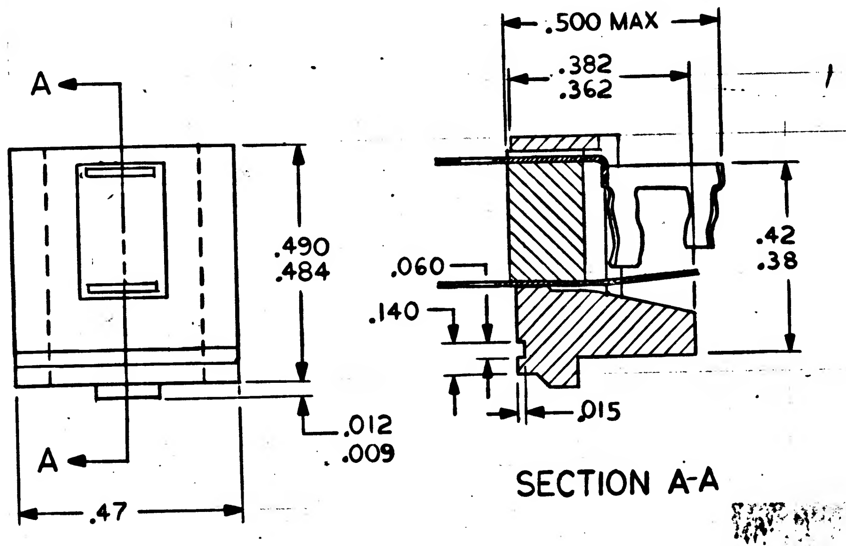


FIGURE 4



SECTION A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± -
DECIMALS ± XX.015 ± XXX.005
ANGLES ± -
DO NOT SCALE THIS DRAWING
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FINAL FINISH

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DWG. NO
CONTRACT NASA 9-497
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APPROVAL 8/14/63
APPROVAL
NASA APPROVAL 8/21/63
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INDICATOR-LIGHT-SWITCH ASSEMBLY
(HERMETICALLY SEALED SWITCHES)

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INCHES
0 1 2
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B	1010627

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02742	8/21/63	JW
A	REVISED PER TDRR 10539	6/29/64	WK
B	REVISED PER TDRR 12500	9-15-69	

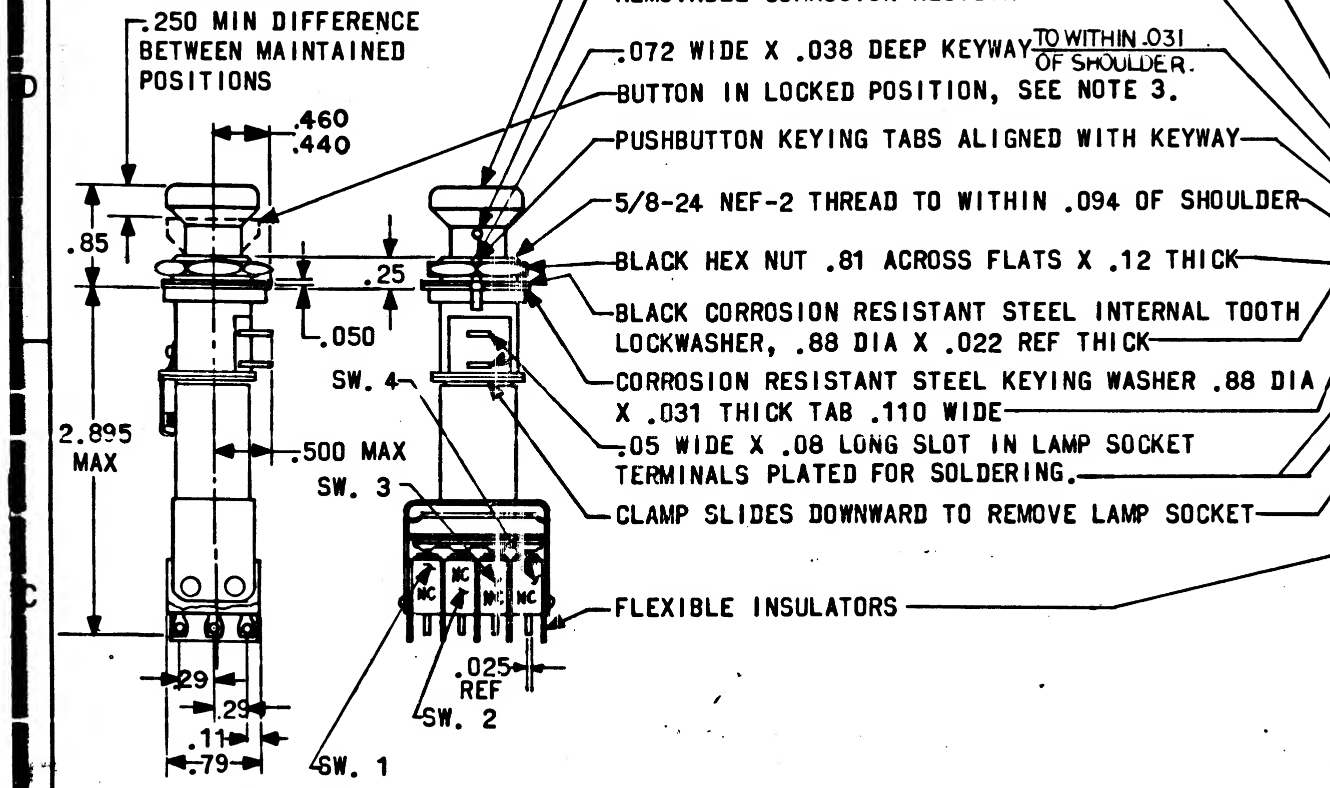

.250 MIN DIFFERENCE BETWEEN MAINTAINED POSITIONS
.460
.440
.85
.25
.050
2.895 MAX
.500 MAX
SW. 4
SW. 3
.025 REF
SW. 2
SW. 1
.29
.29
.11
.79
NC
REMOVABLE TRANSLUCENT PUSHBUTTON (SEE NOTE 1)
SEE NOTE 3
REMOVABLE CORROSION RESISTANT STEEL PIN
.072 WIDE X .038 DEEP KEYWAY TO WITHIN .031 OF SHOULDER.
BUTTON IN LOCKED POSITION, SEE NOTE 3.
PUSHBUTTON KEYING TABS ALIGNED WITH KEYWAY
5/8-24 NEF-2 THREAD TO WITHIN .094 OF SHOULDER
BLACK HEX NUT .81 ACROSS FLATS X .12 THICK
BLACK CORROSION RESISTANT STEEL INTERNAL TOOTH LOCKWASHER, .88 DIA X .022 REF THICK
CORROSION RESISTANT STEEL KEYING WASHER .88 DIA X .031 THICK TAB .110 WIDE
.05 WIDE X .08 LONG SLOT IN LAMP SOCKET
TERMINALS PLATED FOR SOLDERING.
CLAMP SLIDES DOWNWARD TO REMOVE LAMP SOCKET
FLEXIBLE INSULATORS

FIGURE 2

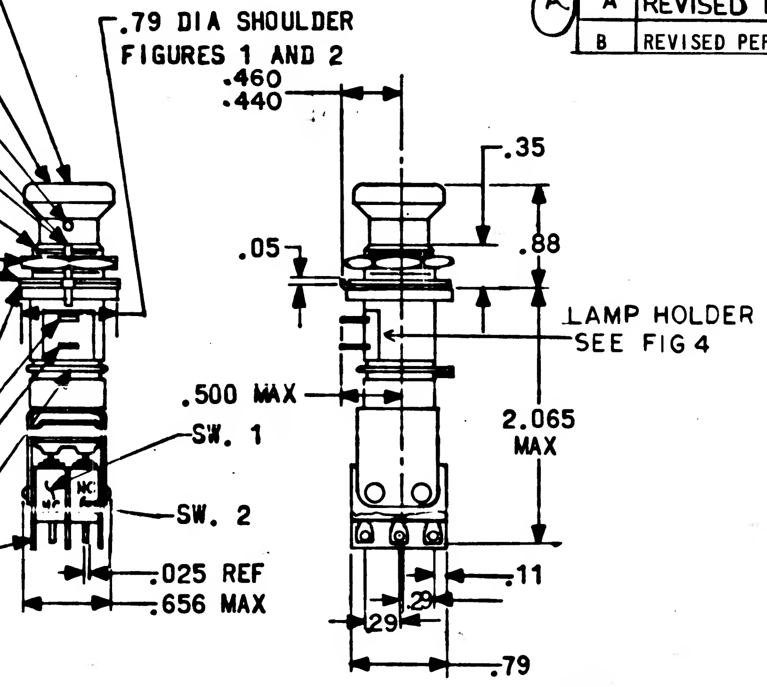
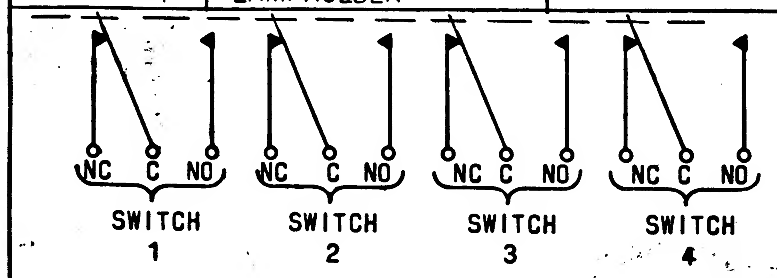


FIGURE 1

TABLE 1

DASH NUMBER	UNIT SWITCHING CIRCUIT	UNIT SWITCHING ACTION		FIGURE NUMBER
-1	2-SPDT	MOMENTARY ACTION		1
-2	4-SPDT	ALTERNATE ACTION		2
-3	(ILLUMINATED BUTTON)	(ILLUMINATED BUTTON)		3
-4	LAMPHOLDER			4



(2 POLE SWITCHES CONSIST OF SWITCHES 1 & 2 ONLY)
SCHEMATIC DIAGRAM (FOR REFERENCE ONLY)

NOTES:
1. PUSH BUTTON (-3) IS NOT SUPPLIED WITH ASSEMBLIES (-1 & -2)
2. SWITCHES DO NOT NECESSARILY OPERATE SIMULTANEOUSLY
3. OPERATING SEQUENCE
   a. NO TO C CIRCUIT IS MADE WHEN PLUNGER IS IN FREE POSITION.
   b. NC TO C CIRCUIT IS MADE WHEN PLUNGER IS IN DEPRESSED POSITION.
   c. ALTERNATE ACTION IS PUSH-ON PUSH-OFF ACTUATION.
4. TOLERANCES-UNLESS OTHERWISE SPECIFIED
   ONE PLACE (.0): ±.030
   TWO PLACE (.00): ±.015
   THREE PLACE (.000): ±.005

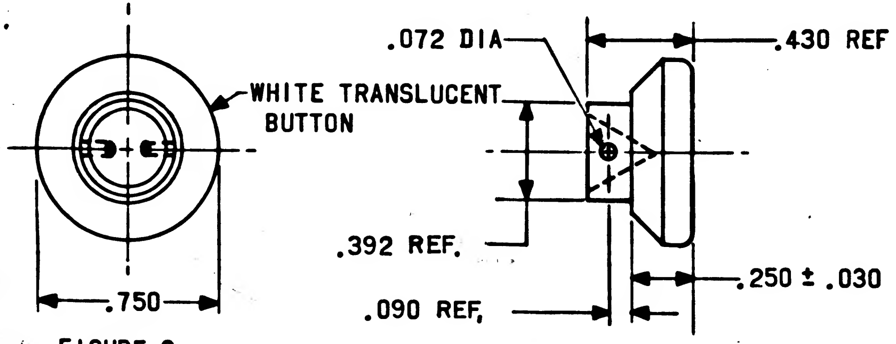


FIGURE 3
(SEE NOTE 1)

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO.
CONTRACT NAS9-497
DRAWN R.W. Turner DATE 3 Jul 63
CHECKED WILSON 10 JULY 63
APPROVAL 8/12/63
APPROVAL
NASA APPROVAL 8/21/63
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INDICATOR-LIGHT-SWITCH ASSEMBLY
(HERMETICALLY SEALED SWITCHES)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010627
SCALE NONE
WT
SHEET 1 OF 4

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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A	REVISED PER TDRR /0539	6/29/64	wlc
B	REVISED PER TDRR 12500	9-15-64	

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 1.

C. UNITS SHALL MEET ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002055 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING. ALL REQUIREMENTS AS LISTED ON THIS DRAWING SHALL TAKE PRECEDENCE OVER THOSE LISTED IN ND 1002055.

2. INSPECTION AND ACCEPTANCE:

A. MECHANICAL REQUIREMENTS:

(1) MARKING:

(a) PIECEMARKING-PART SHALL BE PERMANENTLY AND LEGIBLY MARKED PER ND1002019 WITH THE NASA PART NUMBER, PLUS DASH NUMBER AND REVISION LETTER. SWITCHES SHALL BE MARKED ON ENDS WITH NC AND C FOR TERMINAL IDENTIFICATION AND BASIC SWITCH NO..

(b) PACKAGE-INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION: SUPPLIER'S NAME, NASA PART NUMBER AND REVISION LETTER, SUPPLIER'S LOT OR SERIAL NUMBER, DATE CODE, OR DATE OF MANUFACTURE.

(C) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

(2) ACTUATING CHARACTERISTICS:

(a) OPERATING FORCE: 70 OZ MAXIMUM.
10 OZ MINIMUM.

(b) TOTAL TRAVEL: 1/8 INCH MINIMUM.

(3) TERMINALS: ALL TERMINALS SHALL BE HOT TIN DIPPED. (40-70% TIN CONTENT), ELECTRO-TIN DEPOSITED OR OTHERWISE PLATED TO FACILITATE SOLDERING.

(4) TERMINAL STRENGTH: 3 POUNDS MINIMUM IN AN AXIAL DIRECTION.

(5) DIMENSIONS: PER FIGURES 1, 2, AND 3.

(6) SEALING: (100% INSPECTION) SWITCHES SHALL BE HERMETICALLY SEALED. THEY SHALL BE EVACUATED, VACUUM BAKED, AND BACK FILLED WITH AN INERT, MOISTURE FREE GAS (I.E. DRY NITROGEN). LEAKAGE FOR EACH BASIC SWITCH SHALL BE LESS THAN 10^{-8} CC/SEC (CONVERTED TO LEAKAGE OF HELIUM). THE PRESSURE DIFFERENTIAL SHALL BE 1 ATMOSPHERE.

(7) LENS ILLUMINATION LEVEL: SHALL BE 4.0 FOOT LAMBERTS. MINIMUM AT 5.25 VRMS, 400 CPS WHEN MEASURED USING AN INCANDESCENT LAMP WITH A MEAN SPHERICAL CANDLE POWER OF .078 MINIMUM MEASURED AT 5.0 VOLTS DC.

3. ELECTRICAL REQUIREMENTS:

A. DIELECTRIC STRENGTH: THERE SHALL BE NO BREAKDOWN, DAMAGE FLASHOVER, OR ARCING WHEN VOLTAGE AS FOLLOWS IS APPLIED BETWEEN THE MUTUALLY INSULATED SPECIFIED POINTS FOR FIVE (5) SECONDS.

(1) SEA LEVEL: AT SEA-LEVEL, 1000 VOLTS R.M.S. AT 60 CPS SHALL BE APPLIED BETWEEN ADJACENT CURRENT CARRYING PARTS AND GROUND OR FRAME AND ANY TWO ADJACENT TERMINALS.

B. INSULATION RESISTANCE: 100% INSULATION RESISTANCE SHALL BE A MINIMUM OF 1000 MEGOHMS WHEN MEASURED WITH 100 VDC APPLIED FOR A MAXIMUM OF ONE (1) MINUTE BETWEEN TERMINALS AND GROUND OR FRAME AND MUTUALLY INSULATED PARTS.

C. CONTACT RESISTANCE: (100% INSPECTION) SHALL BE MEASURED WITH ONE HUNDRED (100) MILLIAMPERS FROM A TWO (2) VOLT DC OPEN CIRCUIT VOLTAGE. THE CONTACTS SHALL NOT SWITCH THE MEASURING LOAD. LIMITS SHALL BE .5 OHMS MAX INITIALLY.

4. DESIGN REQUIREMENTS:

A. ENVIORNMENTAL REQUIREMENTS: WHEN TESTED AS STATED IN ND 1002055 OR MIL-STD-202 TO THE LEVELS AS STATED BELOW THERE SHALL BE NO DEGRADATION OR UNDESIRABLE EFFECTS AS STATED IN ND 1002055 AND BELOW.

(1) VIBRATION: PER ND 1002055 EXCEPT THE LEVEL SHALL BE 5-2000 CPS AT 12 G O TO PEAK - (THE RANGE OF VIBRATION FROM 5-2000 CPS FROM 12 G TO 20 G IS PRESENTLY UNDER EVALUATION. THE DRAWING WILL BE REVISED AT A LATER DATE TO UPGRADE THE VIBRATION REQUIREMENT TO THE UNITS CAPABILITY.) DURING AND AFTER VIBRATION NONE OF THE FOLLOWING CONDITIONS SHALL EXIST.

(a) TRANSFER OF CONTACTS FROM ONE POSITION TO THE OTHER. THIS SHALL NOT EXIST EITHER MOMENTARILY OR PERMANENTLY. CONTACT CHATTER IN EXCESS OF 10 MICROSECONDS. SEPARATION OF ELECTRICAL CURRENT CARRYING PARTS (I.E. LAMPS AND LAMP SPRINGS) WHICH MAY INTRODUCE ARCING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ± DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS DWG. NO. CONTRACT NAS9-497	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
APPLICATION		MATERIAL	DRAWN R.W. Turner DATE 9JUL63 CHECKED WILSON 10 JULY 63 APPROVAL 8/16/63 APPROVAL	INDICATOR-LIGHT-SWITCH ASSEMBLY (HERMETICALLY SEALED SWITCHES) SPECIFICATION CONTROL DRAWING
		HEAT TREATMENT	NASA APPROVAL 8/21/63	CODE IDENT NO. SIZE C NASA DRAWING NO. 1010627
		FINAL FINISH	MIT APPROVAL 8/21/63	SCALE WT SHEET 2 OF 4

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SYM	DESCRIPTION	DATE	APPROVAL
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A	REVISED PER TDRR 10539	6/29/64	wk
B	REVISED PER TDRR 12500	9-15-64	

ENVIRONMENTAL REQUIREMENTS: VIBRATION (CONTINUED)

(1) MECHANICAL OR ELECTRICAL DEGRADATION WHICH MAY DEGRADE THE PARTS CAPABILITY OF MEETING ANY OTHER ENVIRONMENT LISTED AS WELL AS MORE VIBRATION AND PERFORMING ACCORDING TO ALL FUNCTIONAL REQUIREMENTS AS LISTED IN THE INSPECTION AND ACCEPTANCE SECTION OF THIS SPECIFICATION.

B. SHOCK:

(1) OPERATING: WHEN TESTED TO MIL-STD-810, METHOD 516, PROCEDURE I (EXCEPT THE SHOCK LEVEL SHALL BE 50 G, 11 MILLISECONDS) NONE OF THE CONDITIONS LISTED IN THE VIBRATION SECTION SHALL EXIST.

(2) NON-OPERATING: PER ND 1002055, EXCEPT THE SHOCK INPUT SHALL BE 78 G'S, 11 MILLISECONDS (HALF-SINE WAVE). ALL COMPONENTS OF THE ASSEMBLY SHALL BE RETAINED BY THE ASSEMBLY AND THE ASSEMBLY SHALL BE RETAINED IN ITS MOUNTED POSITION. DEFORMATION OF THE ASSEMBLY AND FAILURE OF THE SWITCH TO OPERATE WILL BE ALLOWED.

5. TEMPERATURE RANGE:

A. OPERATING: 0 TO +165°F.

B. NON-OPERATING: -65°F TO +165°F

DURING AND AFTER SUBJECTION TO THESE TEMPERATURES, MATERIALS SHALL NOT OUTGASS TOXIC OR CORROSIVE GASES NOR SHALL THE UNIT FAIL TO MEET ANY OTHER ENVIRONMENT OR FUNCTIONAL CHARACTERISTIC. THIS REQUIREMENT MAY BE COMBINED WITH THE FOLLOWING OXYGEN ATMOSPHERE REQUIREMENT.

6. OXYGEN ATMOSPHERE: THIS UNIT SHALL BE CAPABLE OF OPERATION IN AN AMBIENT ATMOSPHERE OF 100% OXYGEN AT PRESSURES VARYING FROM 10^{-4} MILLIMETERS OF MERCURY TO 15 PSIA AND TEMPERATURES VARYING FROM -65°F TO +165°F AS STATED ABOVE. DURING THIS EXPOSURE NONE OF THE FOLLOWING SHALL OCCUR.

EXPLOSION.

ARCING SUFFICIENT TO CREATE OZONE (O_3).

TOXIC OR CORROSIVE OUTGASSING OF MATERIALS.

7. HIGH ALTITUDE: THIS UNIT SHALL BE CAPABLE OF OPERATION AT PRESSURES VARYING FROM 10^{-4} MILLIMETERS OF MERCURY TO 15 PSIA. AT ANY PRESSURE IN THIS RANGE THE UNIT SHALL BE CAPABLE OF MEETING THE DIELECTRIC STRENGTH REQUIREMENT AS LISTED IN THE INSPECTION AND ACCEPTANCE SECTION OF THIS DRAWING, EXCEPT THE APPLIED POTENTIAL SHALL BE 300 VRMS, 60 CPS. THIS REQUIREMENT MAY BE COMBINED WITH THE ABOVE OXYGEN ATMOSPHERE REQUIREMENT.

8. DESIGN REQUIREMENTS: (CONTINUED)

A. ACCELERATION: PER ND 1002055 (20 G'S). NONE OF THE CONDITIONS LISTED IN THE VIBRATION SECTION SHALL EXIST.

B. LIFE: THIS UNIT SHALL BE CAPABLE OF 15,000 OPERATIONS MINIMUM OVER THE AMBIENT TEMPERATURE AND PRESSURE RANGE, AT ANY OF THE RATED LOADS. DURING ANY CYCLE OF LIFE THE CONTACT RESISTANCE SHALL NOT EXCEED ONE (1) OHM AND NO MECHANICAL FAILURES SHALL OCCUR. AFTER LIFE THE FOLLOWING FUNCTIONAL PARAMETERS SHALL NOT EXCEED THE VALUES LISTED WHEN CHECKED AS STATED ABOVE.

(1) CONTACT RESISTANCE (.5 OHMS AFTER LIFE WHEN CHECKED AT THE LIFE TEST LOAD)

(2) DIELECTRIC STRENGTH (DERATED TO 500 VRMS, 60 CPS)

(3) INSULATION RESISTANCE

(4) OPERATING FORCE

(5) TOTAL TRAVEL

(6) SEALING

THE ACCUMULATION OF LIFE CYCLES, UP TO THE MINIMUM OF 15,000 SHALL NOT DETERIORATE THE UNITS CAPABILITY OF MEETING THE OTHER ENVIRONMENTS AS SPECIFIED.

C. HUMIDITY: PER ND 1002055

D. MATERIALS AND FINISHES: ALL MATERIALS AND FINISHES USED ON THESE ASSEMBLIES SHALL NOT OUTGAS ANY TOXIC OR CORROSIVE GASES. MATERIALS AND FINISHES USED SHALL NOT CORRODE OR DETERIORATE AS A RESULT OF THE ENVIRONMENTS LISTED OR DURING NORMAL USAGE.

E. LENS MATERIAL: SHALL CONFORM TO "MATERIALS" REQUIREMENT AS STATED ABOVE, SHALL BE WHITE TRANSLUCENT, AND SHALL BE FREE OF INTERNAL AND EXTERNAL CRACKS, SHALL BE FREE OF SURFACE INDENTATIONS VISABLE WITHOUT MAGNIFICATION, SHALL BE CAPABLE OF MEETING ALL THE ENVIRONMENTS LISTED IN THIS DRAWING OR IN ND 1002055 WITHOUT DISTORTION, AND SHALL BE SUITABLE FOR ENGRAVING OF LEGENDS.

F. INDEXING: LENS (BUTTON) SHALL BE EITHER PHYSICALLY CAPTIVE OR INDEXED TO PREVENT INTERCHANGING OF LENS BETWEEN DIFFERENT SWITCHES.

G. LAMPS: UNIT SHALL BE CAPABLE OF RECEIVING ANY LAMP WITH A MINIATURE FLANGE BASE (T-1-3/4) (SIMILAR TO NO. 327 LAMP). (LAMPS ARE NOT SUPPLIED WITH THIS UNIT).

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO
CONTRACT NASA 9-497
DRAWN R.W. Turner DATE 5 JUL 63
CHECKED WILSON 10 JULY 63
APPROVAL 8/16/63
APPROVAL
NASA APPROVAL 8/21/63
MIT APPROVAL D. Hazel 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INDICATOR-LIGHT-SWITCH ASSEMBLY
(HERMETICALLY SEALED SWITCHES)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010627
SCALE
WT
SHEET 3 OF 4

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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B	REVISED PER TDRR 12500	9-15-64	

DESIGN REQUIREMENTS: (CONTINUED)

H. SWITCHING CHARACTERISTICS: (SEE NOTE 2 AND NOTE 3)
INDIVIDUAL SWITCHING CIRCUIT: INDIVIDUAL SWTICHES SHALL BE SPDT - BREAK BEFORE MAKE. (NC-C-NO)
UNIT SWITCHING CIRCUIT: PER TABLE I
UNIT SWITCHING ACTION: PER TABLE I

J. SWITCH CONTACT RATING: (PER POLE)

TYPE LOAD	VOLTAGE	CURRENT (MAX.)
RESISTIVE	28 VOLTS DC	5 AMPERES
INDUCTIVE	28 VOLTS DC	3 AMPERES
LAMP	28 VOLTS DC	1 AMPERE

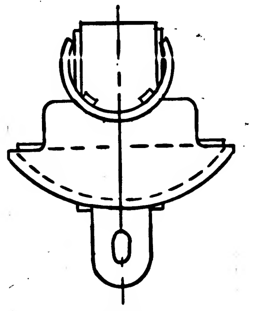
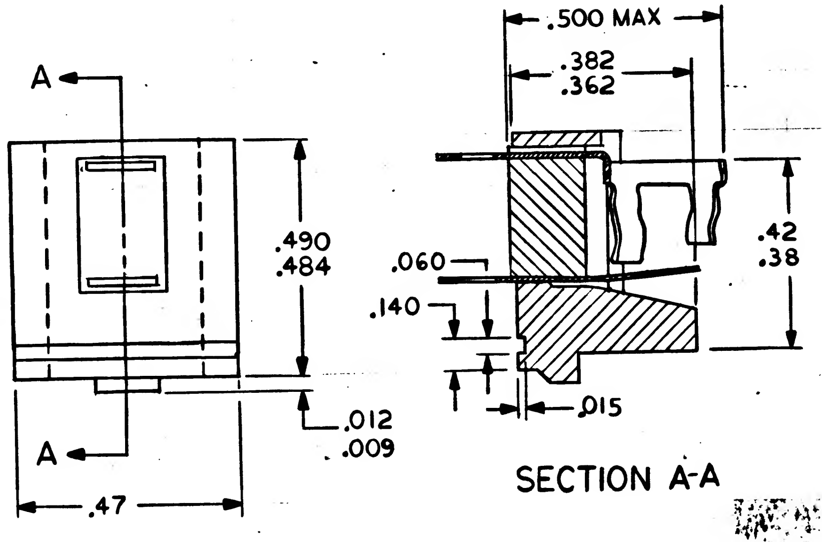


FIGURE 4



SECTION A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± XX.015 XXX.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NASA 9-497
DRAWN R. W. [illegible] DATE 5 JUL 63
CHECKED WILSON 10 JULY 63
APPROVAL 8/16/63
APPROVAL
NASA APPROVAL 8/21/63
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INDICATOR-LIGHT-SWITCH ASSEMBLY
(HERMETICALLY SEALED SWITCHES)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010627
SCALE
WT
SHEET 4 OF 4

INCHES
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— 1010627

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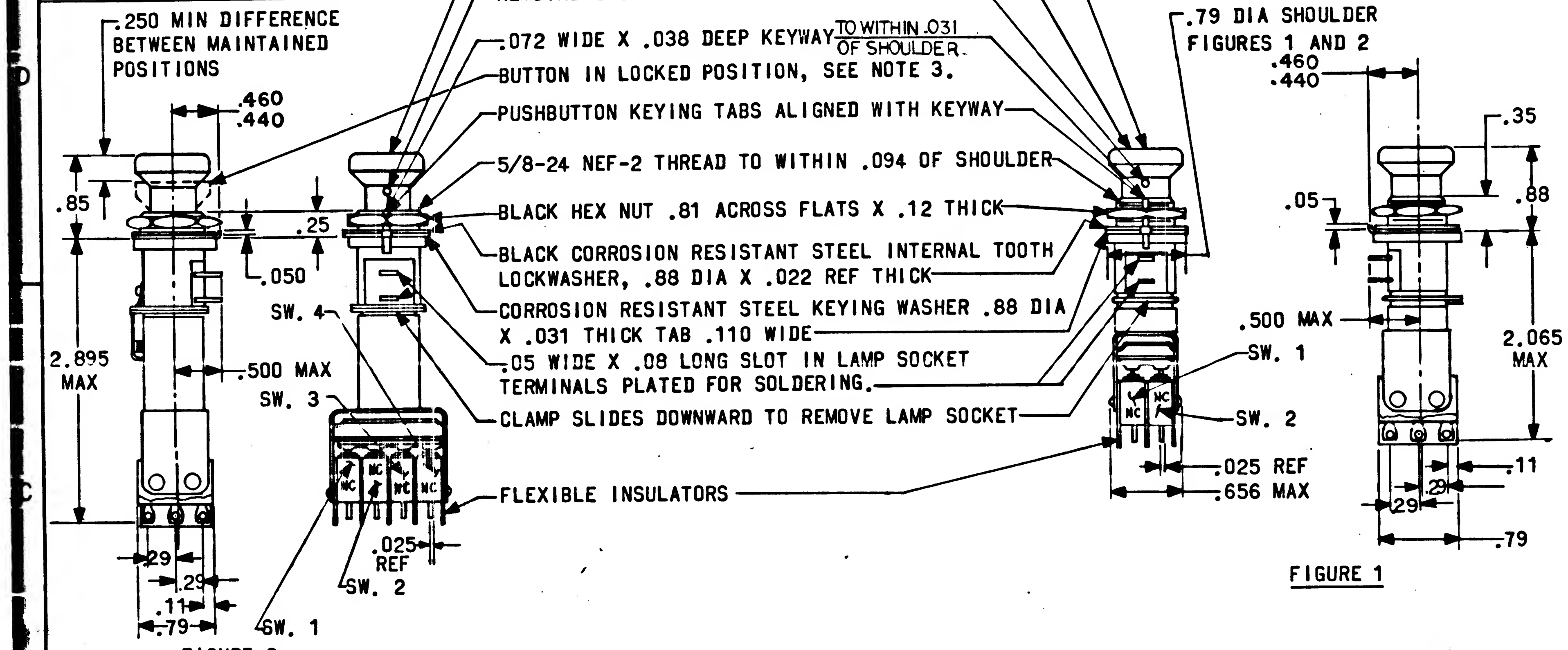
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REMOVABLE TRANSLUCENT PUSHBUTTON (SEE NOTE 1)
SEE NOTE 3
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BUTTON IN LOCKED POSITION, SEE NOTE 3.
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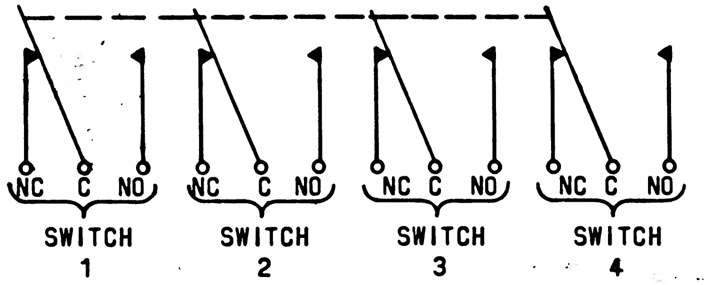
.05 WIDE X .08 LONG SLOT IN LAMP SOCKET TERMINALS PLATED FOR SOLDERING.
CLAMP SLIDES DOWNWARD TO REMOVE LAMP SOCKET
FLEXIBLE INSULATORS
NC
NO
C
.79 DIA SHOULDER FIGURES 1 AND 2
.460
.440
.35
.05
.88
.500 MAX
SW. 1
SW. 2
2.065 MAX
.025 REF
.656 MAX
.11
.29
.29
.79

FIGURE 2

FIGURE 1

TABLE 1

DASH NUMBER	UNIT SWITCHING CIRCUIT	UNIT SWITCHING ACTION		FIGURE NUMBER
-1	2-SPDT	MOMENTARY ACTION		1
-2	4-SPDT	ALTERNATE ACTION		2
-3	(ILLUMINATED BUTTON)	(ILLUMINATED BUTTON)		3



(2 POLE SWITCHES CONSIST OF SWITCHES 1 & 2 ONLY)
SCHEMATIC DIAGRAM (FOR REFERENCE ONLY)

NOTES
1. PUSH BUTTON (-3) IS NOT SUPPLIED WITH ASSEMBLIES (-1 & -2)
2. SWITCHES DO NOT NECESSARILY OPERATE SIMULTANEOUSLY
3. OPERATING SEQUENCE
   a. NO TO C CIRCUIT IS MADE WHEN PLUNGER IS IN FREE POSITION.
   b. NC TO C CIRCUIT IS MADE WHEN PLUNGER IS IN DEPRESSED POSITION.
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4. TOLERANCES-UNLESS OTHERWISE SPECIFIED
   ONE PLACE (.0): ±.030
   TWO PLACE (.00): ±.015
   THREE PLACE (.000): ±.005

—	—	—	—
SHEET 1	SHEET 2	SHEET 3	SHEET 4
REVISION STATUS OF SHEETS			

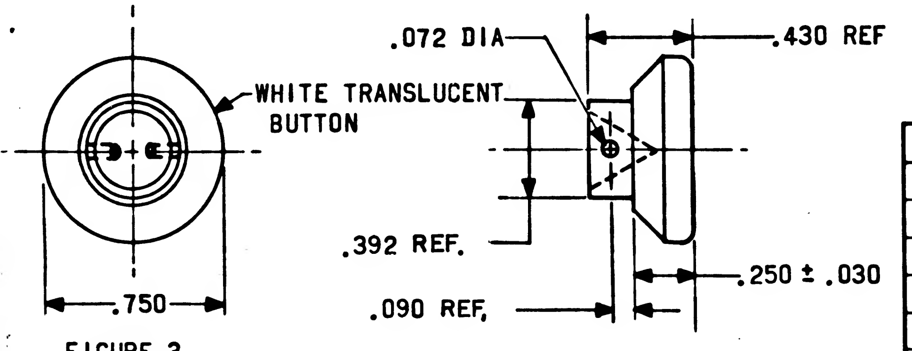

FIGURE 3
(SEE NOTE 1)

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

NEXT ASSY	USED ON
APPLICATION	

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS9-497

DRAWN R.W. Turner DATE 3 JUL 63
CHECKED WILSON 10 JULY 63
APPROVAL 8/16/63
APPROVAL
NASA APPROVAL 8/21/63
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INDICATOR-LIGHT-SWITCH ASSEMBLY
(HERMETICALLY SEALED SWITCHES)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010627
SCALE NONE WT SHEET 1 OF 4

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010627

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02742	8/12/63	JW

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 1.

UNITS SHALL MEET ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002055 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING. ALL REQUIREMENTS AS LISTED ON THIS DRAWING SHALL TAKE PRECEDENCE OVER THOSE LISTED IN ND 1002055.

INSPECTION AND ACCEPTANCE:

MECHANICAL REQUIREMENTS:

MARKING:

PIECEMARKING-PART SHALL BE PERMANENTLY AND LEGIBLY MARKED PER MIL-STD-130 WITH THE NASA PART NUMBER, PLUS DASH NUMBER AND REVISION LETTER. SWITCHES SHALL BE MARKED ON ENDS WITH NC AND C FOR TERMINAL IDENTIFICATION AND BASIC SWITCH NO..

PACKAGE-INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION: SUPPLIER'S NAME, NASA PART NUMBER AND REVISION LETTER, SUPPLIER'S LOT OR SERIAL NUMBER, DATE CODE, OR DATE OF MANUFACTURE.

MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

ACTUATING CHARACTERISTICS:

OPERATING FORCE: 70 OZ MAXIMUM.
10 OZ MINIMUM.

TOTAL TRAVEL: 1/8 INCH MINIMUM.

TERMINALS: ALL TERMINALS SHALL BE HOT TIN DIPPED. (40-70% TIN CONTENT), ELECTRO-TIN DEPOSITED OR OTHERWISE PLATED TO FACILITATE SOLDERING.

TERMINAL STRENGTH: 3 POUNDS MINIMUM IN AN AXIAL DIRECTION.

DIMENSIONS: PER FIGURES 1, 2, AND 3.

SEALING: (100% INSPECTION) SWITCHES SHALL BE HERMETICALLY SEALED. THEY SHALL BE EVACUATED, VACUUM BAKED, AND BACK FILLED WITH AN INERT, MOISTURE FREE GAS (I.E. DRY NITROGEN). LEAKAGE FOR EACH BASIC SWITCH SHALL BE LESS THAN 10^{-8} CC/SEC (CONVERTED TO LEAKAGE OF HELIUM). THE PRESSURE DIFFERENTIAL SHALL BE 1 ATMOSPHERE.

LENS ILLUMINATION LEVEL: 4.0 FOOT LAMBERTS MINIMUM WITH 5.75 VOLTS DC APPLIED, WHEN MEASURED WITH A STANDARD CALIBRATED LAMP.

ELECTRICAL REQUIREMENTS:

DIELECTRIC STRENGTH: THERE SHALL BE NO BREAKDOWN, DAMAGE FLASHOVER, OR ARCING WHEN VOLTAGE AS FOLLOWS IS APPLIED BETWEEN THE MUTUALLY INSULATED SPECIFIED POINTS FOR FIVE (5) SECONDS.

SEA LEVEL: AT SEA-LEVEL, 1000 VOLTS R.M.S. AT 60 CPS SHALL BE APPLIED BETWEEN ADJACENT CURRENT CARRYING PARTS AND GROUND OR FRAME AND ANY TWO ADJACENT TERMINALS.

INSULATION RESISTANCE: 100% INSULATION RESISTANCE SHALL BE A MINIMUM OF 1000 MEGOHMS WHEN MEASURED WITH 100 VDC APPLIED FOR A MAXIMUM OF ONE (1) MINUTE BETWEEN TERMINALS AND GROUND OR FRAME AND MUTUALLY INSULATED PARTS.

CONTACT RESISTANCE: (100% INSPECTION) SHALL BE MEASURED WITH ONE HUNDRED (100) MILLIAMPERS FROM A TWO (2) VOLT DC OPEN CIRCUIT VOLTAGE. THE CONTACTS SHALL NOT SWITCH THE MEASURING LOAD. LIMITS SHALL BE .5 OHMS MAX INITIALLY.

DESIGN REQUIREMENTS:

ENVIORNMENTAL REQUIREMENTS: WHEN TESTED AS STATED IN ND 1002055 OR MIL-STD-202 TO THE LEVELS AS STATED BELOW THERE SHALL BE NO DEGRADATION OR UNDESIRABLE EFFECTS AS STATED IN ND 1002055 AND BELOW.

VIBRATION: PER ND 1002055

EXCEPT THE LEVEL SHALL BE 5-2000 CPS AT 12 G 0 TO PEAK - (THE RANGE OF VIBRATION FROM 5-2000 CPS FROM 12 G TO 20 G IS PRESENTLY UNDER EVALUATION. THE DRAWING WILL BE REVISED AT A LATER DATE TO UPGRADE THE VIBRATION REQUIREMENT TO THE UNITS CAPABILITY.) DURING AND AFTER VIBRATION NONE OF THE FOLLOWING CONDITIONS SHALL EXIST.

TRANSFER OF CONTACTS FROM ONE POSITION TO THE OTHER. THIS SHALL NOT EXIST EITHER MOMENTARILY OR PERMANENTLY.

CONTACT CHATTER IN EXCESS OF 10 MICROSECONDS. SEPARATION OF ELECTRICAL CURRENT CARRYING PARTS (I.E. LAMPS AND LAMP SPRINGS) WHICH MAY INTRODUCE ARCING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS9-497
DRAWN R.W. Turner DATE 9JUL63
CHECKED WILSON 10 JULY 63
APPROVAL J.E. Nevins 8/16/63
APPROVAL
NASA APPROVAL 8/21/63
MIT APPROVAL D. Nagel 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INDICATOR-LIGHT-SWITCH ASSEMBLY
(HERMETICALLY SEALED SWITCHES)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010627
SCALE	WT	SHEET 2 OF 4

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 02742	8/21/63	

ENVIRONMENTAL REQUIREMENTS: VIBRATION (CONTINUED)

MECHANICAL OR ELECTRICAL DEGRADATION WHICH MAY DEGRADE THE PARTS CAPABILITY OF MEETING ANY OTHER ENVIRONMENT LISTED AS WELL AS MORE VIBRATION AND PERFORMING ACCORDING TO ALL FUNCTIONAL REQUIREMENTS AS LISTED IN THE INSPECTION AND ACCEPTANCE SECTION OF THIS SPECIFICATION.

SHOCK:

OPERATING: WHEN TESTED TO MIL-STD-810, METHOD 516, PROCEDURE I (EXCEPT THE SHOCK LEVEL SHALL BE 50 G, 11 MILLISECONDS) NONE OF THE CONDITIONS LISTED IN THE VIBRATION SECTION SHALL EXIST.

NON-OPERATING: PER ND 1002055, EXCEPT THE SHOCK INPUT SHALL BE 78 G'S, 11 MILLISECONDS (HALF-SINE WAVE). ALL COMPONENTS OF THE ASSEMBLY SHALL BE RETAINED BY THE ASSEMBLY AND THE ASSEMBLY SHALL BE RETAINED IN ITS MOUNTED POSITION. DEFORMATION OF THE ASSEMBLY AND FAILURE OF THE SWITCH TO OPERATE WILL BE ALLOWED.

TEMPERATURE RANGE:

OPERATING: 0 TO +165°F.

NON-OPERATING: -65°F TO +165°F

DURING AND AFTER SUBJECTION TO THESE TEMPERATURES, MATERIALS SHALL NOT OUTGASS TOXIC OR CORROSIVE GASES NOR SHALL THE UNIT FAIL TO MEET ANY OTHER ENVIRONMENT OR FUNCTIONAL CHARACTERISTIC. THIS REQUIREMENT MAY BE COMBINED WITH THE FOLLOWING OXYGEN ATMOSPHERE REQUIREMENT.

OXYGEN ATMOSPHERE: THIS UNIT SHALL BE CAPABLE OF OPERATION IN AN AMBIENT ATMOSPHERE OF 100% OXYGEN AT PRESSURES VARYING FROM 10^{-4} MILLIMETERS OF MERCURY TO 15 PSIA AND TEMPERATURES VARYING FROM -65°F TO +165°F AS STATED ABOVE. DURING THIS EXPOSURE NONE OF THE FOLLOWING SHALL OCCUR.

EXPLOSION.

ARCING SUFFICIENT TO CREATE OZONE (O_3).

TOXIC OR CORROSIVE OUTGASSING OF MATERIALS.

HIGH ALTITUDE: THIS UNIT SHALL BE CAPABLE OF OPERATION AT PRESSURES VARYING FROM 10^{-4} MILLIMETERS OF MERCURY TO 15 PSIA. AT ANY PRESSURE IN THIS RANGE THE UNIT SHALL BE CAPABLE OF MEETING THE DIELECTRIC STRENGTH REQUIREMENT AS LISTED IN THE INSPECTION AND ACCEPTANCE SECTION OF THIS DRAWING, EXCEPT THE APPLIED POTENTIAL SHALL BE 300 VRMS, 60 CPS. THIS REQUIREMENT MAY BE COMBINED WITH THE ABOVE OXYGEN ATMOSPHERE REQUIREMENT.

DESIGN REQUIREMENTS: (CONTINUED)

ACCELERATION: PER ND 1002055 (20 G'S). NONE OF THE CONDITIONS LISTED IN THE VIBRATION SECTION SHALL EXIST.

LIFE: THIS UNIT SHALL BE CAPABLE OF 15,000 OPERATIONS MINIMUM OVER THE AMBIENT TEMPERATURE AND PRESSURE RANGE, AT ANY OF THE RATED LOADS. DURING ANY CYCLE OF LIFE THE CONTACT RESISTANCE SHALL NOT EXCEED ONE (1) OHM AND NO MECHANICAL FAILURES SHALL OCCUR. AFTER LIFE THE FOLLOWING FUNCTIONAL PARAMETERS SHALL NOT EXCEED THE VALUES LISTED WHEN CHECKED AS STATED ABOVE.

CONTACT RESISTANCE (.5 OHMS AFTER LIFE WHEN CHECKED AT THE LIFE TEST LOAD)

DIELECTRIC STRENGTH (DERATED TO 500 VRMS, 60 CPS)

INSULATION RESISTANCE

OPERATING FORCE

TOTAL TRAVEL

SEALING

THE ACCUMULATION OF LIFE CYCLES, UP TO THE MINIMUM OF 15,000 SHALL NOT DETERIORATE THE UNITS CAPABILITY OF MEETING THE OTHER ENVIRONMENTS AS SPECIFIED.

HUMIDITY: PER ND 1002055

MATERIALS AND FINISHES: ALL MATERIALS AND FINISHES USED ON THESE ASSEMBLIES SHALL NOT OUTGAS ANY TOXIC OR CORROSIVE GASES. MATERIALS AND FINISHES USED SHALL NOT CORRODE OR DETERIORATE AS A RESULT OF THE ENVIRONMENTS LISTED OR DURING NORMAL USAGE.

LENS MATERIAL: SHALL CONFORM TO "MATERIALS" REQUIREMENT AS STATED ABOVE, SHALL BE WHITE TRANSLUCENT, AND SHALL BE FREE OF INTERNAL AND EXTERNAL CRACKS, SHALL BE FREE OF SURFACE INDENTATIONS VISABLE WITHOUT MAGNIFICATION, SHALL BE CAPABLE OF MEETING ALL THE ENVIRONMENTS LISTED IN THIS DRAWING OR IN ND 1002055 WITHOUT DISTORTION, AND SHALL BE SUITABLE FOR ENGRAVING OF LEGENDS.

INDEXING: LENS (BUTTON) SHALL BE EITHER PHYSICALLY CAPTIVE OR INDEXED TO PREVENT INTERCHANGING OF LENS BETWEEN DIFFERENT SWITCHES.

LAMPS: UNIT SHALL BE CAPABLE OF RECEIVING ANY LAMP WITH A MINIATURE FLANGE BASE (T-1-3/4) (SIMILAR TO NO. 327 LAMP). (LAMPS ARE NOT SUPPLIED WITH THIS UNIT).

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

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TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NASA 9-497
DRAWN R.W. Tr... DATE 8 JUL 63
CHECKED WILSON 10 JULY 63
APPROVAL 8/16/63
APPROVAL
NASA APPROVAL 8/21/63
MIT APPROVAL D Nagel 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INDICATOR-LIGHT-SWITCH ASSEMBLY
(HERMETICALLY SEALED SWITCHES)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010627
SCALE	WT	SHEET 3 OF 4

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

— 1010627

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02742	8/21/63	

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

DESIGN REQUIREMENTS: (CONTINUED)

SWITCHING CHARACTERISTICS: (SEE NOTE 2 AND NOTE 3)

INDIVIDUAL SWITCHING CIRCUIT: INDIVIDUAL SWTICHES SHALL BE SPDT - BREAK BEFORE MAKE. (NC-C-NO)

UNIT SWITCHING CIRCUIT: PER TABLE I

UNIT SWITCHING ACTION: PER TABLE I

SWITCH CONTACT RATING: (PER POLE)

TYPE LOAD	VOLTAGE	CURRENT (MAX.)
RESISTIVE	28 VOLTS DC	5 AMPERES
INDUCTIVE	28 VOLTS DC	3 AMPERES
LAMP	28 VOLTS DC	1 AMPERE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

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APPLICATION

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG. NO
CONTRACT NASA 9-497
DRAWN R. W. [illegible] DATE 5 JUL 63
CHECKED WILSON 10 JULY 63
APPROVAL [illegible] 8/16/63
APPROVAL
NASA APPROVAL [illegible] 8/21/63
MIT APPROVAL [illegible] 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INDICATOR-LIGHT-SWITCH ASSEMBLY
(HERMETICALLY SEALED SWITCHES)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010627
SCALE
WT
SHEET 4 OF 4

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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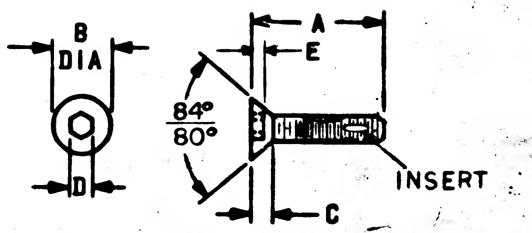
1010628 A

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 02742	9/21/63	
A	REVISED PER TDRR 10044	6/9/64	

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. UNLESS OTHERWISE SPECIFIED SCREWS SHALL MEET THE REQUIREMENTS OF FF-S-86, TYPE IV.
   - D. INSERT SHALL MEET THE REQUIREMENTS OUTLINED IN MIL-F-18240, TYPE B.
   - E. PERFORMANCE REQUIREMENT IN ACCORDANCE WITH MIL-F-18240.
2. INSPECTION AND ACCEPTANCE:
   - A. MATERIAL: CRES PER FF-S-86.
   - B. FINISH: PASSIVATE PER MIL-F-14072, E300.
   - C. DIMENSIONS: AS SHOWN IN TABLE
   - D. SCREWS SHALL BE BURR FREE.
   - E. MARKING:
     - (1) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
       - (a) SUPPLIER'S NAME
       - (b) NASA PART NUMBER, DASH NUMBER AND REVISION LETTER PER ND1002019.
       - (c) DATE CODE OR DATE OF MANUFACTURE
     - MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

NASA PART NUMBER	THREAD SIZE		DIMENSIONS A±.015	B±.015	C MAX	D	E MIN
1010628 -1	2-56NC-3A		.187	.182	.064	.0500 .0510	.038
-2			.250				
-3			.312				
-4			.375				
-5			.437				
-6			.500				
-7							
-8							
-9							
-10							
-11							
-12	4-40NC-3A		.187	.240	.083	.0625 .0635	.055
-13			.250				
-14			.312				
-15			.375				
-16			.437				
-17			.500				
-18			.625	.240	.083	.0625 .0635	.055
-19							
-20							
-21							
-22							
-23	6-32NC-3A		.187	.292	.097	.0781 .0791	.066
-24			.250				
-25			.312				
-26			.375				
-27			.437				
-28			.500				



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH SEE REQUIREMENTS

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS 9-497
DRAWN DATE 30 JULY 63
CHECKED WILSON 1 AUG 63
APPROVAL
APPROVAL 8-16-63
NASA APPROVAL 8/21/63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCREW, FLAT HEAD SELF LOCKING SOCKET, HEX

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010628
SCALE NONE
WT
SHEET 1 OF 1

SCD

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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1010628 B

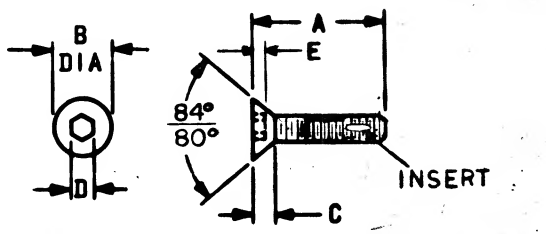
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 02742	9/12/63	Dw
A	REVISED PER TDRR 10044	6/9/64	WH
B	REVISED PER TDRR 11509	8/14/64	WH

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. UNLESS OTHERWISE SPECIFIED SCREWS SHALL MEET THE REQUIREMENTS OF FF-S-86, TYPE IV.
   - D. INSERT SHALL MEET THE REQUIREMENTS OUTLINED IN MIL-F-18240, TYPE B.
   - E. PERFORMANCE REQUIREMENT IN ACCORDANCE WITH MIL-F-18240.
2. INSPECTION AND ACCEPTANCE:
   - A. MATERIAL: CRES PER FF-S-86.
   - B. FINISH: PASSIVATE PER MIL-F-14072, E300.
   - C. DIMENSIONS: AS SHOWN IN TABLE
   - D. SCREWS SHALL BE BURR FREE.
   - E. MARKING:
     - (1) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
       - (a) SUPPLIER'S NAME
       - (b) NASA PART NUMBER, DASH NUMBER AND REVISION LETTER PER ND1002019.
       - (c) DATE CODE OR DATE OF MANUFACTURE

     MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

NASA PART NUMBER	THREAD SIZE	DIMENSIONS A±.015	B±.015	C MAX	D	E MIN
1010628-1	2-56NC-3A	.187	.182	.064	.0500	.038
-2		.250	↓	↓	.0510	↓
-3		.312			↓	
-4		.375				
-5		.437				
-6		.500				
-7						
-8						
-9						
-10						
-11						
-12	4-40NC-3A	.187	.240	.083	.0625	.055
-13		.250	↓	↓	.0635	↓
-14		.312			↓	
-15		.375				
-16		.437				
-17		.500				
-18		.625	.240	.083	.0625	.055
-19		1.750	.240	.083	.0635	.055
-20						
-21						
-22						
-23	6-32NC-3A	.187	.292	.097	.0781	.066
-24		.250	↓	↓	.0791	↓
-25		.312			↓	
-26		.375				
-27		.437				
↓ -28		.500				



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS 9-497

DRAWN P.J. Foster DATE 30 JULY 63
CHECKED WILSON 1 AUG 63
APPROVAL
APPROVAL P.J. Sinaco 8-16-63
NASA APPROVAL 8/21/63
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCREW, FLAT HEAD SELF LOCKING
SOCKET, HEX

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010628
SCALE NONE
WT
SHEET 1 OF 1

S.C.D.

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010628 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 02742	8/21/63	
A	REVISED PER TDRR 10044	6/9/64	
B	REVISED PER TDRR 11509	8/14/64	
C	REVISED PER TDRR 13956	11-12-64	

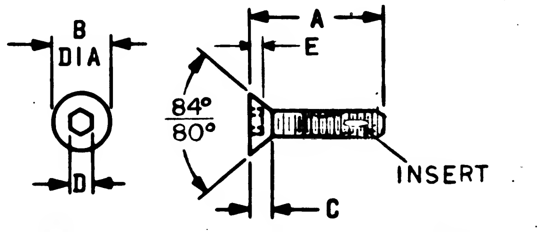
REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. UNLESS OTHERWISE SPECIFIED SCREWS SHALL MEET THE REQUIREMENTS OF FF-S-86, TYPE IV.
   - D. INSERT SHALL MEET THE REQUIREMENTS OUTLINED IN MIL-F-18240, TYPE B.
   - E. PERFORMANCE REQUIREMENT IN ACCORDANCE WITH MIL-F-18240.

2. INSPECTION AND ACCEPTANCE:
   - A. MATERIAL: CRES PER FF-S-86.
   - B. FINISH: PASSIVATE PER MIL-F-14072, E300.
   - C. DIMENSIONS: AS SHOWN IN TABLE
   - D. SCREWS SHALL BE BURR FREE.
   - E. MARKING:
     - (1) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
       - (a) SUPPLIER'S NAME
       - (b) NASA PART NUMBER, DASH NUMBER AND REVISION LETTER PER ND1002019.
       - (c) DATE CODE OR DATE OF MANUFACTURE

     MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

NASA PART NUMBER	THREAD SIZE	DIMENSIONS A±.015	B±.015	C MAX	D	E MIN
1010628-1	2-56NC-3A	.187	.182	.064	.0500	.038
-2		.250	↓	↓	.0510	↓
-3		.312			↓	
-4		.375				
-5		.437				
-6		.500				
-7						
-8						
-9						
-10						
-11						
-12	4-40NC-3A	.187	.240	.083	.0625	.055
-13		.250	↓	↓	.0635	↓
-14		.312			↓	
-15		.375				
-16		.437				
-17		.500				
-18		.625	.240	.083	.0625	.055
-19		1.750	.240	.083	.0635	.055
-20		1.500	.240	.083	.0635	.055
-21						
-22						
-23	6-32NC-3A	.187	.292	.097	.0781	.066
-24		.250	↓	↓	.0791	↓
-25		.312			↓	
-26		.375				
-27		.437				
-28		.500				



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH SEE REQUIREMENTS

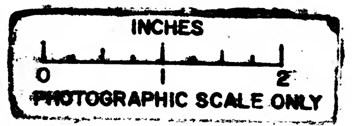
MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT NAS 9-497
DRAWN P.J. Foster DATE 30 JULY 63
CHECKED Wilson 1 AUG 63
APPROVAL
APPROVAL F.J. Siraco 8-16-63
NASA APPROVAL 8/21/63
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCREW, FLAT HEAD SELF LOCKING
SOCKET, HEX

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010628
SCALE NONE
WT
SHEET 1 OF 1

S.C.D.



1010628 D

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 02742	9/12/62	
A	REVISED PER TDRR 10044	6/9/64	WR
B	REVISED PER TDRR 11509	8/14/64	WR
C	REVISED PER TDRR 13956	11-12-64	WR
D	REVISED PER TDRR 15575	2/2/65	WR

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

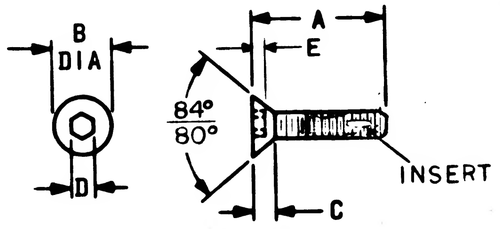
REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. UNLESS OTHERWISE SPECIFIED SCREWS SHALL MEET THE REQUIREMENTS OF FF-S-86, TYPE IV.
   - D. INSERT SHALL MEET THE REQUIREMENTS OUTLINED IN MIL-F-18240, TYPE B.
   - E. PERFORMANCE REQUIREMENT IN ACCORDANCE WITH MIL-F-18240.

2. INSPECTION AND ACCEPTANCE:
   - A. MATERIAL: CRES PER FF-S-86.
   - B. FINISH: PASSIVATE PER MIL-F-14072, E300.
   - C. DIMENSIONS: AS SHOWN IN TABLE
   - D. SCREWS SHALL BE BURR FREE.
   - E. MARKING:
     - (1) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
       - (a) SUPPLIER'S NAME
       - (b) NASA PART NUMBER, DASH NUMBER AND REVISION LETTER PER ND1002019.
       - (c) DATE CODE OR DATE OF MANUFACTURE

     MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

NASA PART NUMBER	THREAD SIZE	DIMENSIONS				
		A±.015	B±.015	C MAX	D	E MIN
1010628-1	2-56NC-3A	.187	.182	.064	.0500 .0510	.038
-2		.250				
-3		.312				
-4		.375				
-5		.437				
-6		.500				
-7						
-8						
-9						
-10						
-11						
-12	4-40NC-3A	.187	.240	.083	.0625 .0635	.055
-13		.250				
-14		.312				
-15		.375				
-16		.437				
-17		.500				
-18		.625	.240	.083	.0625	.055
-19		1.750	.240	.083	.0635	.055
-20		1.500	.240	.083	.0635	.055
-21						
-22						
-23	6-32NC-3A	.187	.292	.097	.0781 .0791	.066
-24		.250				
-25		.312				
-26		.375				
-27		.437				
-28		.500				
-29		.562				
-30		.625				
-31		.687				
-32		.750				
-33		.812				
-34		.875				
-35		.937				
-36		1.000				



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS 9-497

DRAWN P J Foster DATE 30 JULY 63
CHECKED WILSON 1AUG 63
APPROVAL
APPROVAL J Sinaco 8-16-63
NASA APPROVAL 8/21/63
MIT APPROVAL 9/12/62

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCREW, FLAT HEAD SELF LOCKING
SOCKET, HEX

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010628
SCALE NONE
WT
SHEET 1 OF 1

S.C.D.

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

— 1010628

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 02742	9/21/63	Dn

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

UNLESS OTHERWISE SPECIFIED SCREWS SHALL MEET THE REQUIREMENTS OF FF-S-86, TYPE IV.

INSERT SHALL MEET THE REQUIREMENTS OUTLINED IN MIL-F-18240, TYPE B.

PERFORMANCE REQUIREMENT IN ACCORDANCE WITH MIL-F-18240.

INSPECTION AND ACCEPTANCE:

MATERIAL: CRES PER FF-S-86.

FINISH: PASSIVATE PER MIL-F-14072, E300.

DIMENSIONS: AS SHOWN IN TABLE

SCREWS SHALL BE BURR FREE.

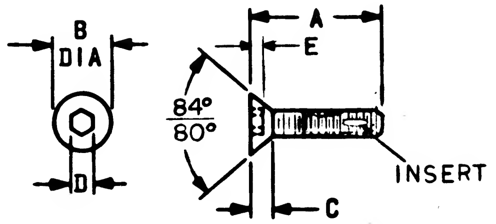
MARKING:

PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:

- SUPPLIER'S NAME
- NASA PART NUMBER, DASH NUMBER AND REVISION LETTER.
- DATE CODE OR DATE OF MANUFACTURE

MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

NASA PART NUMBER	THREAD SIZE		DIMENSIONS				
			A±.015	B±.015	C MAX	D	E MIN
1010628 -1	2-56NC-3A		.187	.182	.064	.0500	.038
-2			.250			.0510	
-3			.312				
-4			.375				
-5			.437	↓	↓	↓	↓
-6			.500				
-7							
-8							
-9							
-10							
-11							
-12	4-40NC-3A		.187	.240	.083	.0625	.055
-13			.250			.0635	
-14			.312				
-15			.375				
-16			.437	↓	↓	↓	↓
-17			.500				
-18							
-19							
-20							
-21							
-22							
-23	6-32NC-3A		.187	.292	.097	.0781	.066
-24			.250			.0791	
-25			.312				
-26			.375				
-27			.437	↓	↓	↓	↓
-28 ↓			.500				



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS NAS
DWG NO CONTRACT 9-497

DRAWN P.J. Foster DATE 30 JULY 63
CHECKED Wilson 1 AUG 63
APPROVAL
APPROVAL J.J. Siraco 8-16-63
NASA APPROVAL 8/21/63
MIT APPROVAL J. Hafel 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCREW, FLAT HEAD SELF LOCKING SOCKET, HEX

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010628
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

- 1010629

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02740	8/21/63	DW

NASA PART NUMBER	THREAD SIZE	H DIA	L	MIN. SHEET THICKNESS (REF)	HOLE (DIA.) IN SHEET (REF)	ANVIL DIMENSIONS (REF) A	B	NUT TIGHTENING TORQUE IN-LBS (REF)
1010629-1	4-40-2A	.187	.250	.040	.111-.114	.120-.125	.010	4-3/4
-2	↓	↓	.312	↓	↓	↓	↓	↓
-3			.375					
-4			.500					
-5	6-32-2A	.219	.312	.040	.137-.140	.145-.150	.010	9
-6	↓	↓	.375	↓	↓	↓	↓	↓
-8			.500					
-10			.625					
-12			.750					
-13	8-32-2A	.250	.375	.040	.163-.166	.170-.175	.010	18
-14	↓	↓	.500	↓	↓	↓	↓	↓
-15			.625					
-16			.750					
-17			.875					
-18			1.000					
-19	10-24-2A	.266	.375	.040	.189-.192	.195-.200	.010	24
-20	↓	↓	.500	↓	↓	↓	↓	↓
-21			.625					
-22			.750					
-23			.875					
-24			1.000					
-25	10-32-2A	.266	.375	.040	.189-.192	.195-.200	.010	32
-26	↓	↓	.500	↓	↓	↓	↓	↓
-27			.625					
-28			.750					
-29			.875					
-30			1.000					

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

THREADS TO MEET THE REQUIREMENTS OF MIL-S-7742.

SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

INSPECTION AND ACCEPTANCE:

MATERIAL: STAINLESS STEEL (18-8 OR 16-18) PER MIL-S-7720 OR AS SPECIFIED IN FF-S-86.

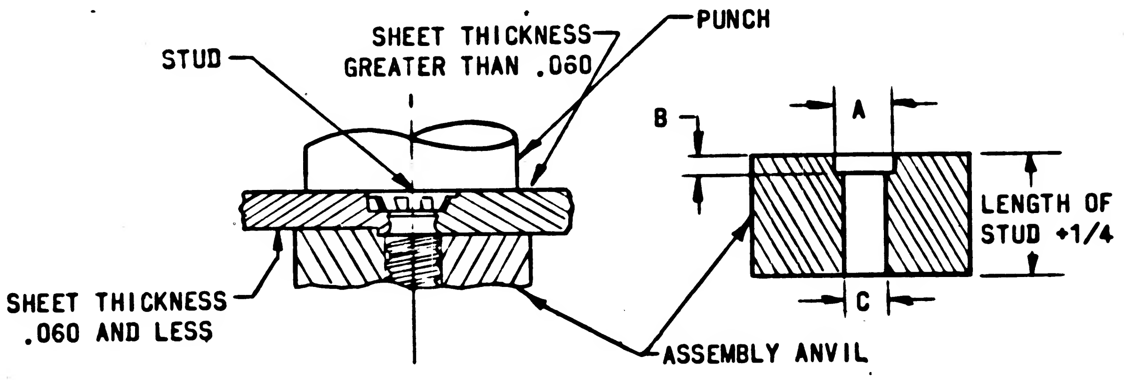
FINISH: PASSIVATE PER MIL-F-14072, E300.

DIMENSIONS: AS SHOWN IN TABLE

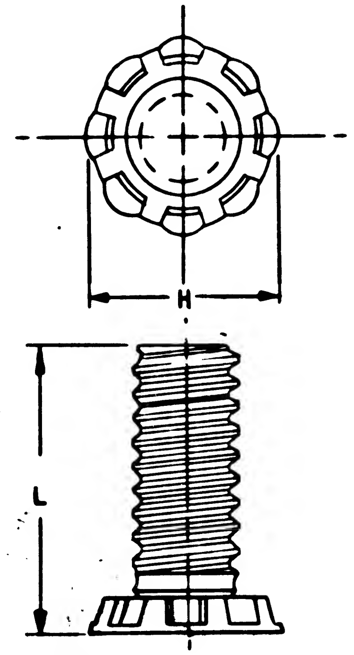
MARKING:

PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION: SUPPLIER'S NAME, NASA PART NUMBER AND REVISION LETTER, SUPPLIER'S LOT OR SERIAL NUMBER, DATE CODE, OR DATE OF MANUFACTURE.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.


STUD
SHEET THICKNESS GREATER THAN .060
PUNCH
B
A
LENGTH OF STUD +1/4
C
SHEET THICKNESS .060 AND LESS
ASSEMBLY ANVIL

INSTALLATION DATA



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NAS 9-497
DWG NO

DRAWN DATE 6AUG63
CHECKED WILSON 6 AUG 63
APPROVAL D. B. Test 20AUG63
APPROVAL
NASA APPROVAL 8/2/63
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STUD, SELF CLINCHING

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO 1010629
SCALE NONE
WT
SHEET 1 OF 1

58

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010630 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02472	7 AUG 63	WK
A	REVISED PER TDRR 04223	24 Oct 63	WK

REQUIREMENTS:

1 GENERAL:

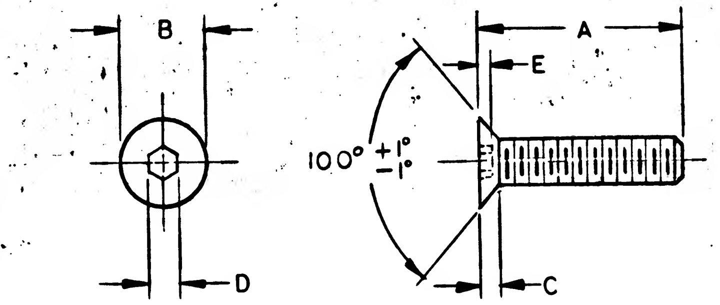
- A INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS SPECIFIED IN MIL-D-70327.
- B SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
- C THREADS SHALL BE PER MIL-S-7742 AND SCREWS SHALL BE BURR FREE.
- D UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF FF-S-86

2 INSPECTION AND ACCEPTANCE:

- A MATERIAL: 18-8 OR 16-18 CORROSION RESISTANT STEEL, (75,000 PSI MIN. ULT. TEN. STR.)
- B FINISH: PASSIVATE PER MIL-F-14072, E300.
- C DIMENSIONS: AS SHOWN.

NASA PART NUMBER	THREAD SIZE	DIMENSIONS				
		A ±.015	B	C MAX	D +.001 -.000	E
1	2-56NC-3A	.187	.172	.036	.035	.030
2	↓	.250	.156	↓	↓	.020
3		.312	↓			↓
4		.375				
5		.437				
6		.500				
7						
8						
9						
10						
11						
12	4-40NC-3A	.187	.225	.049	.050	.040
13	↓	.250	.207	↓	↓	.035
14		.312	↓			↓
15		.375				
16		.437				
17		.500				
18						
19						
20						
21						
22						
23	6-32NC-3A	.187	.279	.061	.062	.050
24	↓	.250	.257	↓	↓	.045
25		.312	↓			↓
26		.375				
27		.437				
28		.500				
29						
30						
31						
32						
33						
34						
35						

NASA PART NUMBER	THREAD SIZE	DIMENSIONS				
		A SEE NOTE 1	B	C MAX	D +.001 -.000	E
36	8-32NC-3A	.312	.300	.072	.078	.062
37		.375	.332	↓	↓	.057
38		.437	↓			↓
39		.500				
40		.562				
41		.625				
42		.750				
43		.875				
44		1.000				
45		1.125				
46		1.250				
47		1.500				
48		1.750				
49						
50						
51	10-32NF-3A	.375	.348	.083	.094	.072
52		.437	.385	↓	↓	.067
53		.500	↓			↓
54		.562				
55		.625				
56		.750				
57		.875				
58		1.000				
59		1.125				
60		1.250				
61		1.500				
62		1.750				
63		2.000				



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

NOTE 1: LENGTH TOLERANCE: UP TO 1", INCL.: ±.015
OVER 1" TO 2", INCL.: +.031 -.015

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS9-497

DRAWN Weissert DATE 14 JUN 63
CHECKED Wilson 17 June 63
APPROVAL F. Sciacca 7 Aug 63 A.B.
APPROVAL
NASA APPROVAL 8/7/63
MIT APPROVAL 7 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCREW, FLAT HEAD, 100°
HEX SOCKET

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010630
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	DWG NO.
–	1010630

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
–	INITIAL RELEASE CLASS A PER TDRR 02472	7 Aug 63	WK

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS SPECIFIED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

THREADS SHALL BE PER MIL-S-7742 AND SCREWS SHALL BE BURR FREE.

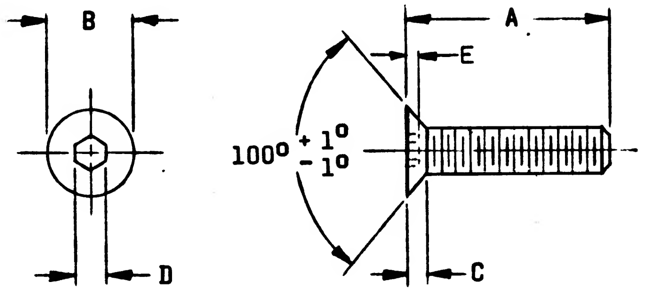
INSPECTION AND ACCEPTANCE:

MATERIAL: 18-8 OR 16-18 CORROSION RESISTANT STEEL, (75,000 PSI MIN. ULT. TEN. STR.)

FINISH: PASSIVATE PER MIL-F-14072, E300.

DIMENSIONS: AS SHOWN.

NASA PART NUMBER	THREAD SIZE	DIMENSIONS				
		A ±.015	B	C MAX	D $^{+.001}_{-.000}$	E
1	2-56NC-3A	.187	.172 .156	.036	.035	.030 .020
2		.250				
3		.312				
4		.375				
5		.437				
6		.500				
7						
8						
9						
10						
11						
12	4-40NC-3A	.187	.225 .207	.049	.050	.040 .035
13		.250				
14		.312				
15		.375				
16		.437				
17		.500				
18						
19						
20						
21						
22						
23	6-32NC-3A	.187	.279 .257	.061	.062	.050 .045
24		.250				
25		.312				
26		.375				
27		.437				
28		.500				



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT NAS9-497
DRAWN Weissert DATE 14 JUN 63
CHECKED Wilson 17 June 63
APPROVAL E. Sinico 1 Aug 63 A.B.
APPROVAL
NASA APPROVAL 8/7/63
MIT APPROVAL 7 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCREW, FLAT HEAD, 100°
HEX SOCKET

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010630
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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A	1010631

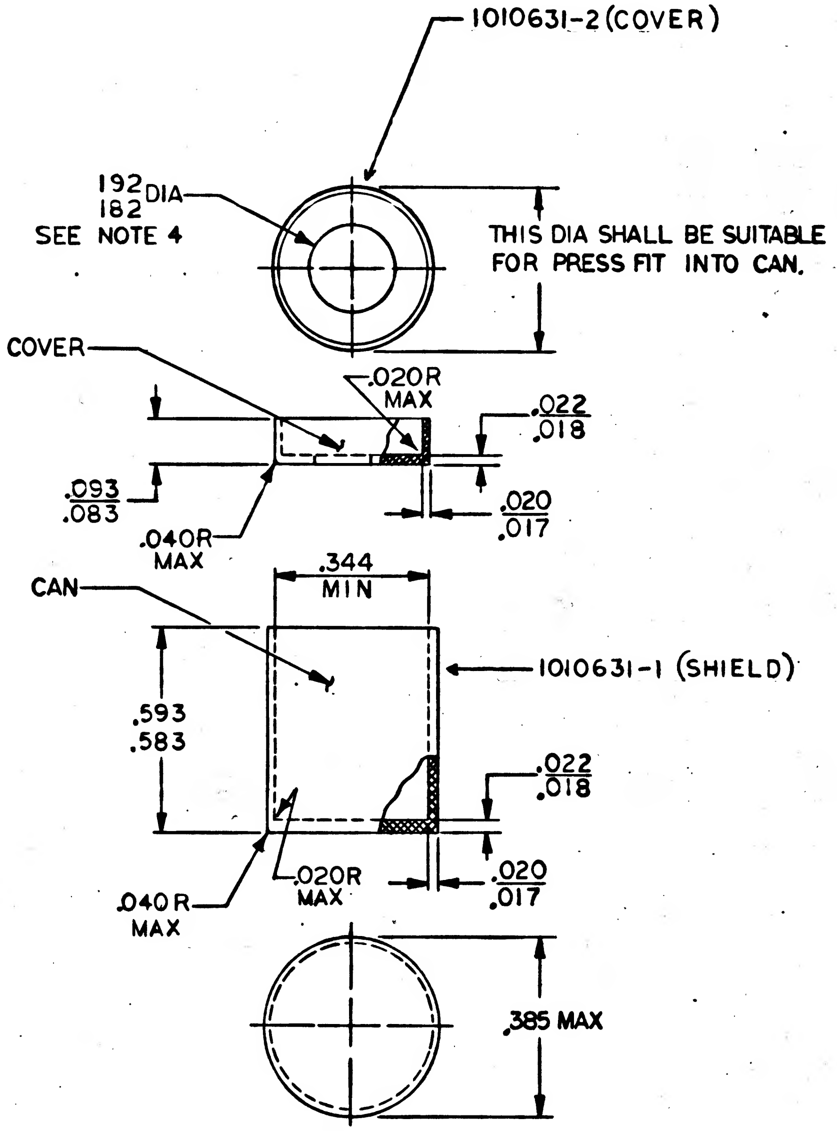
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 03697		
A	REVISED PER TDRR 07471	4/14/64	

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 3.
2. INSPECTION AND ACCEPTANCE:
   - A. DIMENSIONS AND TOLERANCES PER SKETCH
   - B. PARTS SHALL BE PERMANENTLY AND LEGIBLY MARKED PER ND1002019 WITH THE NASA PART NUMBER AND REVISION LETTER.
   - C. PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION: SUPPLIERS NAME, NASA PART NUMBER AND REVISION LETTER, DATE CODE OR DATE OF MANUFACTURE, MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE PER MIL-STD-129.
3. DESIGN REQUIREMENT:
   - A. MATERIAL: "MU METAL"
   - B. CHEMICAL COMPOSITION AS FOLLOWS: (NOMINAL)

(1)	NICKEL	77.2%
(2)	COPPER	4.8%
(3)	CHROMIUM	1.5%
(4)	IRON	14.9%

   - C. HEAT TREATMENT: DRY HYDROGEN ANNEAL AT 2150°F (NOMINAL) FOR 4 HOURS (MIN) IN A DRY HYDROGEN ATMOSPHERE WITH A DEW POINT OF -60 (MIN) COOLING RATE SHALL BE 150°F PER HOUR (MAX) TO 1100°F THEN 600°F PER HOUR (MAX) TO ROOM TEMPERATURE.
   - D. FINISH: NONE
   - E. ENGINEERING NOTES
     1. DO NOT SHOCK THIS MATERIAL BY ROUGH HANDLING AS MAGNETIC SHIELDING PROPERTIES MAY BE IMPAIRED.
     2. DO NOT EXCEED 1300°F IN ANY SOLDERING OPERATION ON THIS MATERIAL.
4. BREAK SHARP EDGES OF HOLE, .005 MINIMUM BOTH SIDES.



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

1010631-1	SHIELD
1010631-2	COVER

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 3.A
HEAT TREATMENT SEE NOTE 3.C
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 17 July 63
CHECKED G. Martz 9-20-63
APPROVAL S. C. Smith 9-25-63
APPROVAL
NASA APPROVAL W J Rhine 10-8-63
MIT APPROVAL 8 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SHIELD, MAGNETIC, SPECIAL
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010631
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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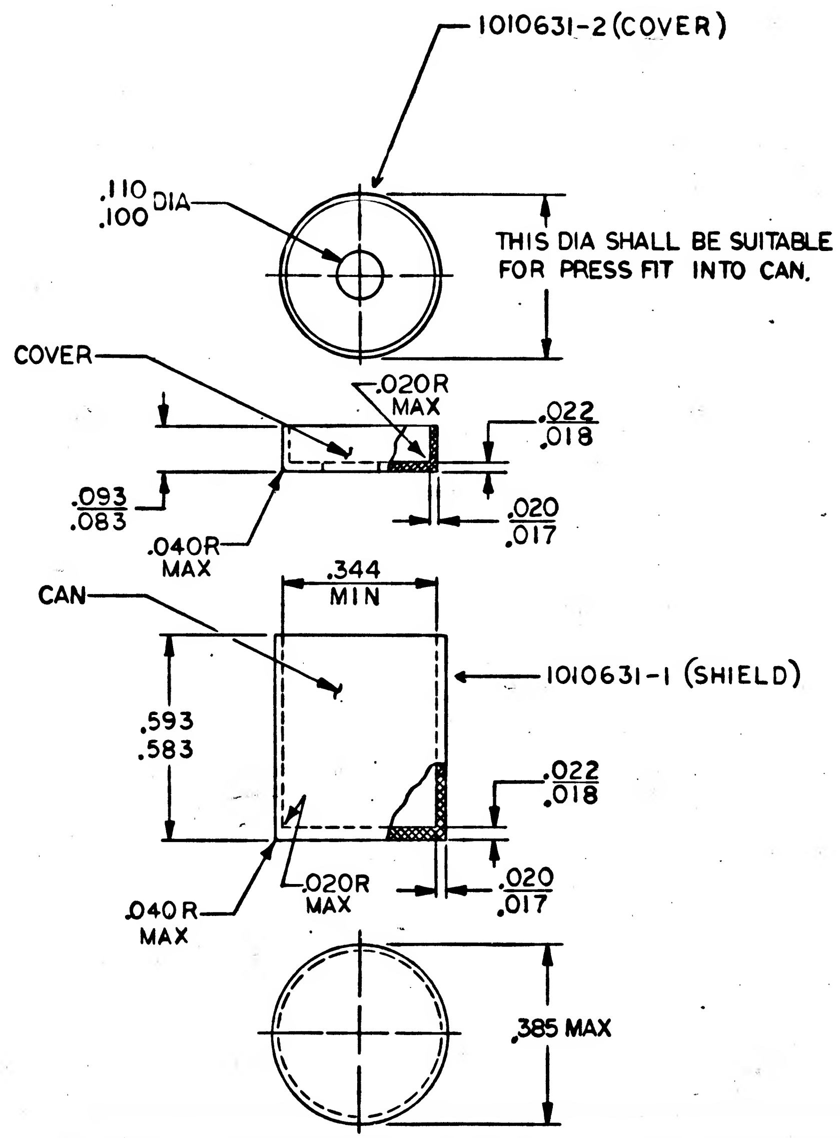
- | 1010631

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 03697		

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 3.
2. INSPECTION AND ACCEPTANCE:
   - A. DIMENSIONS AND TOLERANCES PER SKETCH
   - B. PARTS SHALL BE PERMANENTLY AND LEGIBLY MARKED PER ND1002019 WITH THE NASA PART NUMBER AND REVISION LETTER.
   - C. PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION: SUPPLIERS NAME, NASA PART NUMBER AND REVISION LETTER, DATE CODE OR DATE OF MANUFACTURE, MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.
3. DESIGN REQUIREMENT:
   - A. MATERIAL: "MU METAL"
   - B. CHEMICAL COMPOSITION AS FOLLOWS: (NOMINAL)
     - (1) NICKEL 77.2%
     - (2) COPPER 4.8%
     - (3) CHROMIUM 1.5%
     - (4) IRON 14.9%
   - C. HEAT TREATMENT: DRY HYDROGEN ANNEAL AT 2150°F (NOMINAL) FOR 4 HOURS (MIN) IN A DRY HYDROGEN ATMOSPHERE WITH A DEW POINT OF -60 (MIN) COOLING RATE SHALL BE 150°F PER HOUR (MAX) TO 1100°F THEN 600°F PER HOUR (MAX) TO ROOM TEMPERATURE.
   - D. FINISH: NONE
   - E. ENGINEERING NOTES
     1. DO NOT SHOCK THIS MATERIAL BY ROUGH HANDLING AS MAGNETIC SHIELDING PROPERTIES MAY BE IMPAIRED.
     2. DO NOT EXCEED 1300°F IN ANY SOLDERING OPERATION ON THIS MATERIAL.



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

1010631-1	SHIELD
1010631-2	COVER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kane DATE 17 Jly 63
CHECKED G. Marts 9-20-63
APPROVAL S. C. Smith 9-25-63
APPROVAL
NASA APPROVAL W J Rhine 10-8-63
MIT APPROVAL 8 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SHIELD, MAGNETIC, SPECIAL

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010631
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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1010632

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 03698		

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS B.
   - C. EACH UNIT (JAR, TUBE, SPOOL, ETC.) AND SHIPPING CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS, DATE OF MANUFACTURE.
2. ACCEPTANCE AND INSPECTION REQUIREMENTS:
   - A. THIS MATERIAL SHALL BE A TWO-PART EPOXY VARNISH.
   - B. PHYSICAL PROPERTIES:
     - (1) COLOR: 1010632-1 (PART A) - BLACK
       1010632-2 (PART B) - AMBER
     - (2) SPECIFIC GRAVITY WHEN TESTED IN ACCORDANCE WITH ASTM-D-1963:
       1010632-1 (PART A) - 1.08±0.03
       1010632-2 (PART B) - 0.90±0.03
     - (3) VISCOSITY WHEN TESTED AT ROOM TEMPERATURE WITH A BROOKFIELD VISCOMETER, MODEL RVF OR EQUIV.:
       1010632-1 (PART A) 15,000 - 20,000 CPS WITH NO. 6 SPINDLE AT 20 RPM.
       1010632-2 (PART B) 50 CPS MAXIMUM WITH NO. 1 SPINDLE AT 20 RPM.
     - (4) PERCENT SOLIDS WHEN TESTED IN ACCORDANCE WITH METHOD 4041 OF FED. STD. 141:
       1010632-1 (PART A) - 64 ±3%
       1010632-2 (PART B) - 44 ±3%
3. DESIGN REQUIREMENTS:
   - A. APPLICATION: THE ACTIVATED MATERIAL MAY BE APPLIED BY SPRAYING OR BRUSHING.
   - B. SHELF LIFE OF BOTH PARTS SHALL BE ONE YEAR IN UNOPENED CONTAINERS.
   - C. POT LIFE OF THE ACTIVATED MATERIAL SHALL BE NOT LESS THAN 16 HOURS AT ROOM TEMPERATURE.
   - D. THE MATERIAL SHALL BE FURNISHED IN QUANTITIES SPECIFIED ON THE PURCHASE ORDER.

PROCURE ONLY FROM APPROVED SOURCE LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON	
APPLICATION		
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±		
DO NOT SCALE THIS DRAWING		
MATERIAL	SEE REQUIREMENTS	
HEAT TREATMENT	NONE	
FINAL FINISH	NONE	

MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. DWG. NO. CONTRACT	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
DRAWN C. Inchas DATE 6 Sep. 63	EPOXY VARNISH	
CHECKED W. Riehl 12 Sep. '63	SPECIFICATION CONTROL DRAWING	
APPROVAL H. J. Siracco 10-1-63		
APPROVAL		
NASA APPROVAL W. J. Rhine 10-8-63	CODE IDENT NO.	SIZE C
	NASA DRAWING NO. 1010632	
MIT APPROVAL W Kupfer 8 Oct 63	SCALE —	WT
	SHEET 1 OF 1	

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010633	A

REVISIONS 02924			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL CLASS A RELEASE PER TDRR 02924		
A	REVISED PER TDRR 03966	15Oct63	WK

1. REQUIREMENTS:

A. GENERAL:

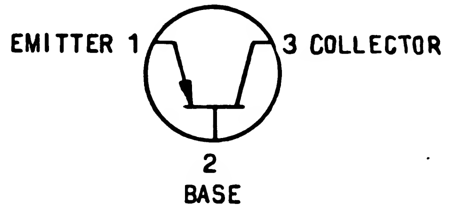
1) INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
2) THE SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 1
3) UNITS SHALL BE CAPABLE OF MEETING ALL THE QUALIFICATION REQUIREMENTS OF ND 1002051, UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
4) UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-P-19491, LEVEL A.
5) UNITS SHALL BE IN ACCORDANCE WITH MIL-S-19500 IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN.

B. INSPECTION AND ACCEPTANCE:

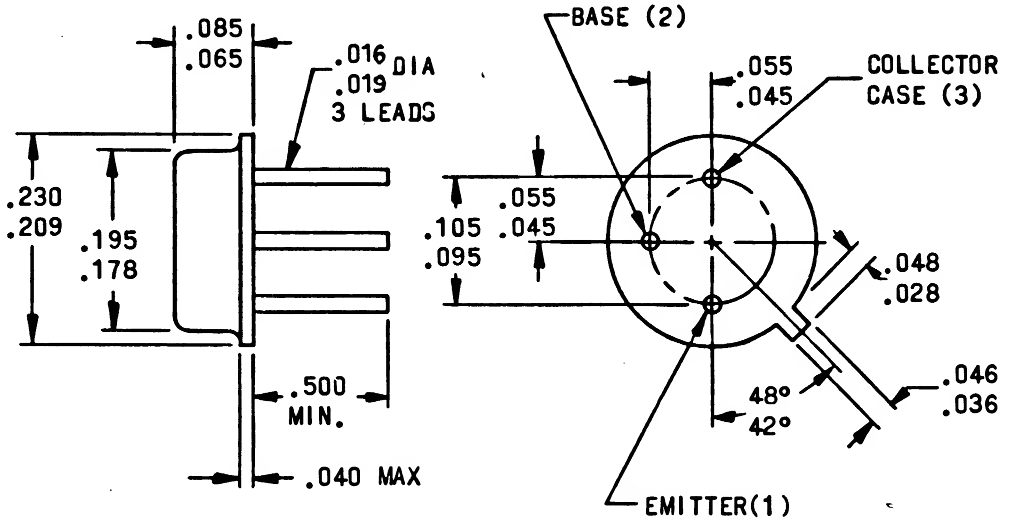
1) MECHANICAL REQUIREMENTS:
   (a) MARKING: THE NASA DRAWING NUMBER, (LAST THREE DIGITS ONLY) DASH NUMBER, AND REVISION LETTER, AND THE MANUFACTURER'S NAME, TRADEMARK, OR CODE; DATE CODE; LOT CODE; AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER MIL-STD-130. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-P-19491 AND SHALL INCLUDE THE NASA DRAWING NUMBER AND REVISION LETTER. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.
   (b) LEAD DATA: KOVAR, WITH GOLD PLATING PER ND 1015402. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
2) ELECTRICAL REQUIREMENTS: PER TABLE II.
   (a) COLLECTOR CUTOFF CURRENT I_{CBO} AT 100°C.
   (b) SWITCHBACK VOLTAGE, LV_{CEO}
   (c) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}, h_{FE2}, h_{FE3}
   (d) BASE SATURATION VOLTAGE, $V_{BE(SAT)}$
   (e) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$

C. DESIGN REQUIREMENTS:

1) STORAGE TEMPERATURE (Tstg): -65° TO +200°C.
2) JUNCTION OPERATING TEMPERATURE (T_J): 175 °C MAXIMUM.
3) ELECTRICAL RATINGS: PER TABLE I.
4) ELECTRICAL CHARACTERISTICS: PER TABLE II.
5) POWER DISSIPATION:
   (a) AT +25°C CASE TEMPERATURE: 2.0 WATTS.
   THERMAL RESISTANCE (θ_{JC}): 75 °C/WATT
   (b) AT +25 °C AMBIENT TEMPERATURE: 360 MILLIWATTS
   THERMAL REISISTANCE (θ_{JA}): 417°C/WATT



GRAPHICAL SYMBOL



A	A	—
—	—	—
SHEET 1	SHEET 2	SHEET 3

REVISION STATUS OF SHEETS

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS 9-497

DRAWN OJ Foster DATE 14AUG63
CHECKED WILSON 14 AUG 63
APPROVAL H. A. Test 9-3-63
APPROVAL
NASA APPROVAL 9-5-63
MIT APPROVAL 5Sep63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR, PNP, SILICON

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010633
SCALE NONE
WT
SHEET 1 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS 02924

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL CLASS A RELEASE PER TDRR 02924	5 Sep 63	WK
A	REVISED PER TDRR 03966	15 Oct 63	WK

D. SPECIAL CONDITIONING BY SUPPLIER:

1) BURN-IN: PARTS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITION:
   - (a) AMBIENT TEMPERATURE, T_A = +25° ± 5°C.
   - (b) COLLECTOR VOLTAGE, V_{CE} = -17 VOLTS DC.
   - (c) POWER DISSIPATION: 190 MILLIWATTS ± 10 PERCENT.

2) THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
   - (a) SWITCHBACK VOLTAGE, LV_{CEO}
   - (b) COLLECTOR CUTOFF CURRENT, I_{CBO_1}
   - (c) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$
   - (d) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}

3) BURN-IN DATE SHALL BE INCLUDED WITH EACH SHIPMENT AND SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF THE ABSOLUTE VALUE OF EACH CHARACTERISTIC AND TO SHOW THE FREQUENCY DISTRIBUTION OF THE PERCENT CHANGE OF EACH CHARACTERISTIC FROM ITS INITIAL READING. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVE CHANGED MORE THAN +20%, -40% IN h_{FE} OR HAVING INCREASED MORE THAN .050 UA IN I_{CBO} SHALL NOT BE ACCEPTABLE.

TABLE II

ELECTRICAL CHARACTERISTICS AT TC = +25°C (UNLESS OTHERWISE SPECIFIED) SEE NOTE 2.

PARAMETER	CONDITION	SYMBOL	SPECIFICATION LIMITS		
			MIN	MAX	UNIT
COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=-30 V	I_{CBO1}	-	1.0	uA
COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=-30V, T_C=+150°C	I_{CBO3}	-	100	uA
SWITCHBACK VOLTAGE	I_C=-100 mA, SEE NOTE 1, I_B=0	LV_{CEO}	-35	-	VDC
COLLECTOR TO EMITTER BREAKDOWN VOLTAGE	I_C=-100 mA, SEE NOTE 1, $R_{BE} \leq 10\Omega$	LV_{CER}	-50	-	VDC
STATIC FORWARD CURRENT TRANSFER RATIO	I_C=-150 mA, V_{CE}=-10 V, SEE NOTE 1	h_{FE3}	75	200	-
	I_C=-5 mA, V_{CE}=-10 V, SEE NOTE 1	h_{FE2}	75	-	-
	I_C=-1 mA, V_{CE}=-10 V, SEE NOTE 1	h_{FE1}	40	150	-
BASE SATURATION VOLTAGE	I_C=-150 mA, I_B=-15 mA	$V_{BE(SAT)}$	-	-1.3	VDC
COLLECTOR SATURATION VOLTAGE	I_C=-150 mA, I_B=-15 mA	$V_{CE(SAT)}$	-	-1.5	VDC
SMALL-SIGNAL, SHORT CIRCUIT FORWARD CURRENT TRANSFER RATIO	I_C=-50 mA, V_{CE}=-10V, f=20 mc	h_{fe}	3.0	-	-

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LIST OF MATERIALS

NEXT ASSY	USED ON

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
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DO NOT SCALE THIS DRAWING
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HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
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DRAWN B. Foster DATE 14 Aug 63
CHECKED WILSON 14 AUG 63
APPROVAL 9-3-63
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR, PNP, SILICON

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010633
SCALE
WT
SHEET 2 OF 3

INCHES
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NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

1010633 B

REVISIONS 02924			
SYM	DESCRIPTION	DATE	APPROVAL
–	INITIAL CLASS A RELEASE PER TDRR 02924		
A	REVISED PER TDRR 03966	15Oct63	WK
B	REVISED PER TDRR 05144		EHL WK

1. REQUIREMENTS:

A. GENERAL:

1) INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

2) THE SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 1.

3) UNITS SHALL BE CAPABLE OF MEETING ALL THE QUALIFICATION REQUIREMENTS OF ND 1002051, UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

4) UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-S-19491, LEVEL A.

5) UNITS SHALL BE IN ACCORDANCE WITH MIL-S-19500 IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN.

B. INSPECTION AND ACCEPTANCE:

1) MECHANICAL REQUIREMENTS:

(a) MARKING: THE NASA DRAWING NUMBER, WHICH SHALL CONSIST OF AT LEAST THREE DIGITS AND THE

SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER MIL-STD-130. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-S-19491 AND SHALL INCLUDE THE NASA DRAWING NUMBER AND REVISION LETTER. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

(b) LEAD DATA: KOVAR, WITH GOLD PLATING PER ND 1015402. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.

2. ELECTRICAL REQUIREMENTS: PER TABLE II.

(a) COLLECTOR CUTOFF CURRENT I_{CBO} AT 100°C.

(b) SWITCHBACK VOLTAGE, LV_{CEO}

(c) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}, h_{FE2}, h_{FE3}

(d) BASE SATURATION VOLTAGE, $V_{BE(SAT)}$

(e) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$

C. DESIGN REQUIREMENTS:

1) STORAGE TEMPERATURE (Tstg): -65° TO +200°C.

2) JUNCTION OPERATING TEMPERATURE (T_J): 175 °C MAXIMUM.

3) ELECTRICAL RATINGS: PER TABLE 1.

4) ELECTRICAL CHARACTERISTICS: PER TABLE II.

5) POWER DISSIPATION:

(a) AT +25°C CASE TEMPERATURE: 2.0 WATTS.
THERMAL RESISTANCE (θ_{JC}): 75 °C/WATT

(b) AT +25 °C AMBIENT TEMPERATURE: 360 MILLIWATTS
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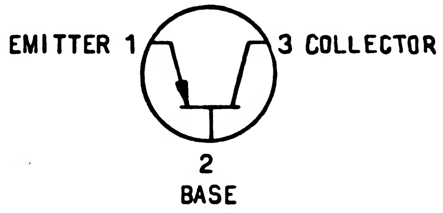
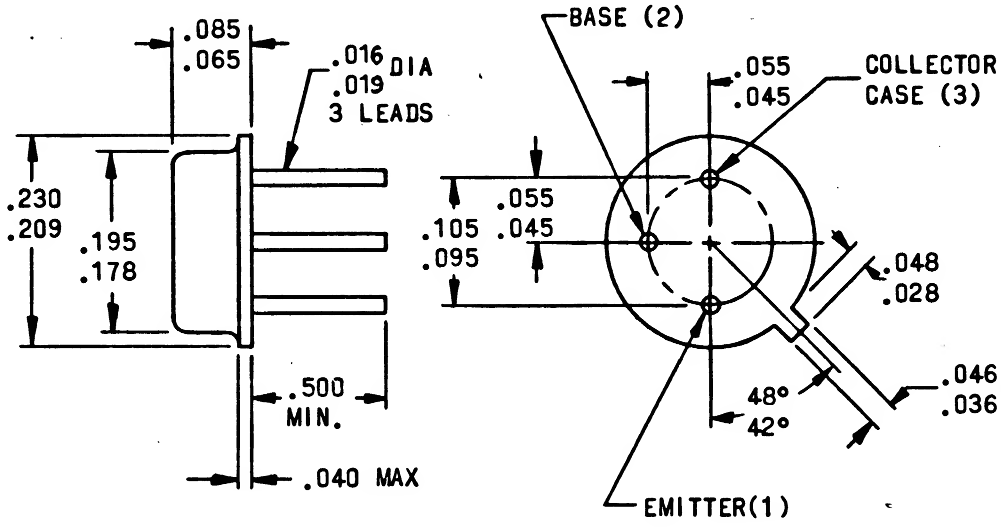


GRAPHICAL SYMBOL



B	A	—
A	A	—
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SHEET 1	SHEET 2	SHEET 3
REVISION STATUS OF SHEETS		

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

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UNLESS OTHERWISE SPECIFIED
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FRACTIONS ± — DECIMALS ± — ANGLES ± —
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MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS 9-497
DRAWN G.J. Foster DATE 14AUG63
CHECKED WILSON 14 AUG 63
APPROVAL D. A. Test 9-3-63
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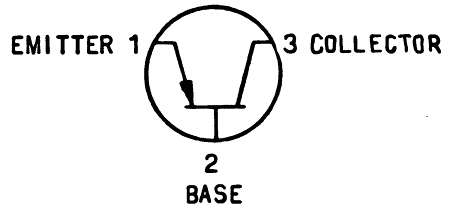
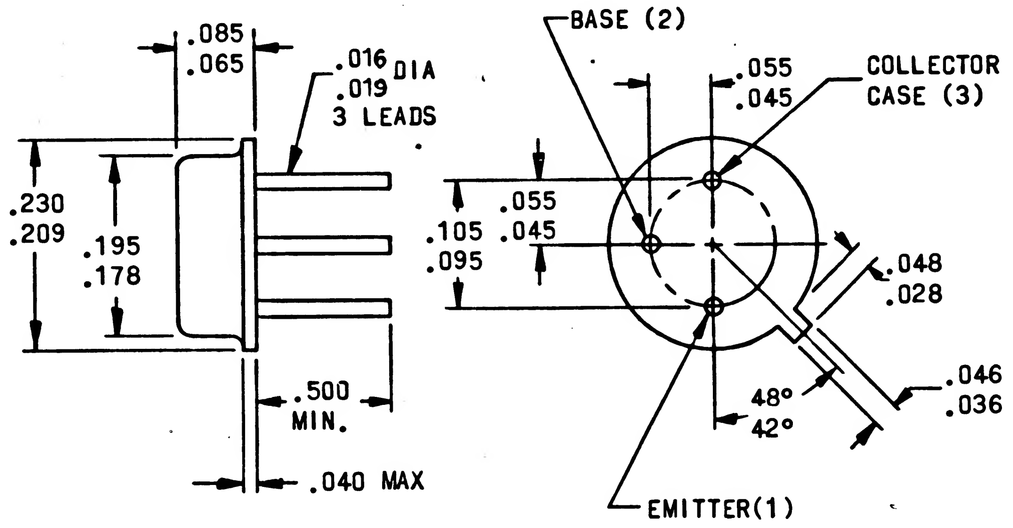


GRAPHICAL SYMBOL



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FINAL FINISH
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DWG NO CONTRACT NAS 9-497

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APPROVAL

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C	REVISED PER TDRR 16035	2/9/65	WK

D. SPECIAL CONDITIONING BY SUPPLIER:

1) BURN-IN: PARTS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITION:
   - (a) AMBIENT TEMPERATURE, T_A = +25° ± 5°C.
   - (b) COLLECTOR VOLTAGE, V_{CE} = -17 VOLTS DC.
   - (c) POWER DISSIPATION: 190 MILLIWATTS ± 10 PERCENT.

2) THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
   - (a) SWITCHBACK VOLTAGE, LV_{CEO}
   - (b) COLLECTOR CUTOFF CURRENT, I_{CBO_1}
   - (c) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$
   - (d) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}

3) BURN-IN DATE SHALL BE INCLUDED WITH EACH SHIPMENT AND SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF THE ABSOLUTE VALUE OF EACH CHARACTERISTIC AND TO SHOW THE FREQUENCY DISTRIBUTION OF THE PERCENT CHANGE OF EACH CHARACTERISTIC FROM ITS INITIAL READING. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVE CHANGED MORE THAN +20%, -40% IN h_{FE} OR HAVING INCREASED MORE THAN .050 UA IN I_{CBO} SHALL NOT BE ACCEPTABLE.

TABLE II

ELECTRICAL CHARACTERISTICS AT TC = +25°C (UNLESS OTHERWISE SPECIFIED) SEE NOTE 2.

PARAMETER	CONDITION	SYMBOL	SPECIFICATION LIMITS		
			MIN	MAX	UNIT
COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=-30 V	I_{CBO1}	-	1.0	uA
COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=-30V, T_C=+150°C	I_{CBO3}	-	100	uA
SWITCHBACK VOLTAGE	I_C=-100 mA, SEE NOTE 1, I_B=0	LV_{CEO}	-35	-	VDC
COLLECTOR TO EMITTER BREAKDOWN VOLTAGE	I_C=-100 mA, SEE NOTE 1, $R_{BE} \leq 10\Omega$	LV_{CER}	-50	-	VDC
STATIC FORWARD CURRENT TRANSFER RATIO	I_C=-150 mA, V_{CE}=-10 V, SEE NOTE 1	h_{FE3}	75	200	-
	I_C=-5 mA, V_{CE}=-10 V, SEE NOTE 1	h_{FE2}	75	-	-
	I_C=-1 mA, V_{CE}=-10 V, SEE NOTE 1	h_{FE1}	40	150	-
BASE SATURATION VOLTAGE	I_C=-150 mA, I_B=-15 mA	$V_{BE(SAT)}$	-	-1.3	VDC
COLLECTOR SATURATION VOLTAGE	I_C=-150 mA, I_B=-15 mA	$V_{CE(SAT)}$	-	-1.5	VDC
SMALL-SIGNAL, SHORT CIRCUIT FORWARD CURRENT TRANSFER RATIO	I_C=-50 mA, V_{CE}=-10V, f=20 mc	h_{fe}	3.0	-	-

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DRAWN Foster DATE 14 AUG 63
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TABLE II (CONTINUED)

PARAMETER	CONDITION	SYMBOL	SPECIFICATION LIMITS MIN	MAX	UNIT
OUTPUT CAPACITANCE	$I_E=0$, $V_{CB}=-10$ V. f=140 kc	C_{ob}	-	45	pf
COLLECTOR CUTOFF CURRENT	$I_E=0$, $V_{CB}=-30$ V $T_C=100°C$	I_{CBO2}	-	50	uA

NOTES:

1. PULSE MEASUREMENTS: PULSE LENGTH = 300 µSEC., DUTY CYCLE≤1%
2. TC IS CASE TEMPERATURE

TABLE I

MANUFACTURER'S ABSOLUTE MAXIMUM RATINGS TC = +25°C

NASA NUMBER	COLLECTOR VOLTAGE (V_{CBO})	COLLECTOR VOLTAGE (V_{CER}) ($R_{BE}\leq 10\Omega$)	EMITTER VOLTAGE (V_{EBO})	COLLECTOR VOLTAGE (V_{CEO})	COLLECTOR POWER DISSIPATION		EIA TYPE DESIGNATION (FOR REF ONLY)
	V_{DC}	V_{DC}	V_{DC}	V_{DC}	W		
1010633-1	-50	-50	-5	-35	2.0		2N2303 (TO-46)
1010633-2	SHALL BE A MATCHED PAIR OF 1010633-1 WITH THE ADDITION THAT h_{FE} SHALL BE MATCHED INITIALLY (AS RECEIVED BY USER) TO WITHIN 10% OF THE LOWER h_{FE} UNIT AT I_C = -1 MA V_{CE} = -10 VOLTS. ²						
1010633-3	PER 1010633-2 EXCEPT, h_{FE} 2 AT I_C = -5MA, VCE =-10V SHALL BE 75 MIN TO 125 MAX.						

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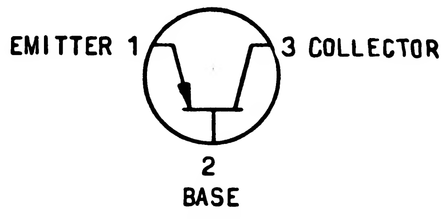

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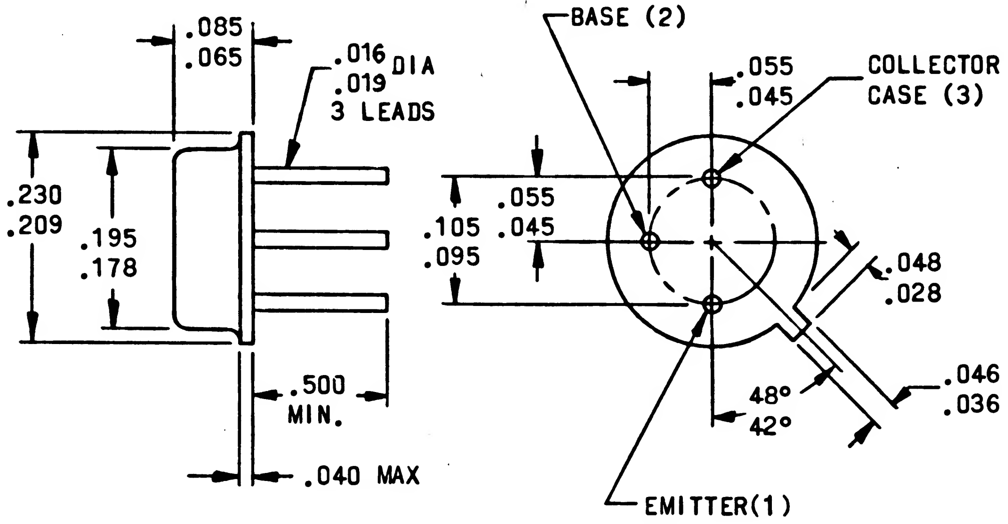

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COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$
STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}

BURN-IN DATE SHALL BE INCLUDED WITH EACH SHIPMENT AND SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF THE ABSOLUTE VALUE OF EACH CHARACTERISTIC AND TO SHOW THE FREQUENCY DISTRIBUTION OF THE PERCENT CHANGE OF EACH CHARACTERISTIC FROM ITS INITIAL READING. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVE CHANGED MORE THAN +20%, -40% IN h_{FE} OR HAVING INCREASED MORE THAN .050 UA IN I_{CBO} SHALL NOT BE ACCEPTABLE.

TABLE II

ELECTRICAL CHARACTERISTICS AT TC = +25°C (UNLESS OTHERWISE SPECIFIED) SEE NOTE 2.

PARAMETER	CONDITION	SYMBOL	SPECIFICATION LIMITS MIN	MAX	UNIT
COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=-30 V	I_{CBO1}	-	1.0	uA
COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=-30V, T_C=+150°C	I_{CBO3}	-	100	uA
SWITCHBACK VOLTAGE	I_C=-100 mA, SEE NOTE 1, I_B=0	LV_{CEO}	-35	-	VDC
COLLECTOR TO EMITTER BREAKDOWN VOLTAGE	I_C=-100 mA, SEE NOTE 1, $R_{BE} \leq 10\Omega$	LV_{CER}	-50	-	VDC
STATIC FORWARD CURRENT TRANSFER RATIO	I_C=-150 mA, V_{CE}=-10 V, SEE NOTE 1	h_{FE3}	75	200	-
	I_C=-5 mA, V_{CE}=-10 V, SEE NOTE 1	h_{FE2}	75	-	-
	I_C=-1 mA, V_{CE}=-10 V, SEE NOTE 1	h_{FE1}	40	120	-
BASE SATURATION VOLTAGE	I_C=-150 mA, I_B=-15 mA	$V_{BE(SAT)}$	-	-1.3	VDC
COLLECTOR SATURATION VOLTAGE	I_C=-150 mA, I_B=-15 mA	$V_{CE(SAT)}$	-	-1.5	VDC
SMALL-SIGNAL, SHORT CIRCUIT FORWARD CURRENT TRANSFER RATIO	I_C=-50 mA, V_{CE}=-10V, f=20 mc	h_{fe}	3.0	-	-

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS 9-497
DRAWN D. Foster DATE 14 AUG 63
CHECKED WILSON 14 AUG 63
APPROVAL D. A. Test 9-3-63
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL W Kupfer 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR, PNP, SILICON

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010633
SCALE
WT
SHEET 2 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

— 1010633

REVISIONS 02924

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL CLASS A RELEASE PER TDRR 02924	5 Sep 63	WK

TABLE II (CONTINUED)

PARAMETER	CONDITION	SYMBOL	SPECIFICATION LIMITS		
			MIN	MAX	UNIT
OUTPUT CAPACITANCE	$I_E=0$, $V_{CB}=-10$ V. f=140 kc	C_{ob}	-	45	pf
COLLECTOR CUTOFF CURRENT	$I_E=0$, $V_{CB}=-30$ V $T_C=100°C$	I_{CBO2}	-	50	uA

NOTES:

1. PULSE MEASUREMENTS: PULSE LENGTH = 300 µSEC., DUTY CYCLE ≤ 1%
2. TC IS CASE TEMPERATURE

TABLE I

MANUFACTURER'S ABSOLUTE MAXIMUM RATINGS TC = +25°C

NASA NUMBER	COLLECTOR VOLTAGE (V_{CBO})	COLLECTOR VOLTAGE (V_{CER}) ($R_{BE} \leq 10\Omega$)	EMITTER VOLTAGE (V_{EBO})	COLLECTOR VOLTAGE (V_{CEO})	COLLECTOR POWER DISSIPATION		EIA TYPE DESIGNATION (FOR REF ONLY)
	V_{DC}	V_{DC}	V_{DC}	V_{DC}	W		
1010633-1	-50	-50	-5	-35	2.0		2N2303 (TO-46)
1010633-2	SHALL BE A MATCHED PAIR OF 1010633-1 WITH THE ADDITION THAT h_{FE} SHALL BE MATCHED INITIALLY (AS RECEIVED BY USER) TO WITHIN 10% OF THE LOWER h_{FE} UNIT AT I_C = -1 MA V_{CE} = -10 VOLTS. 2						

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS 9-497
DRAWN O J Foster DATE 14 AUG 63
CHECKED WILSON 14 AUG 63
APPROVAL 9-3-63
APPROVAL
NASA APPROVAL
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR, PNP, SILICON

SPECIFICATION CONTROL DRAWING.

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010633
SCALE
WT
SHEET 3 OF 3

1010633

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010635 A

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02741	8/21/63	
A	REVISED PER TDRR 20241	6/28/65	

REQUIREMENTS:

1. GENERAL:

A. **INTERPRET DRAWING** IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

C. MARKING:

(1) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION: SUPPLIER'S NAME, NASA PART NUMBER AND REVISION LETTER, SUPPLIER'S LOT OR SERIAL NUMBER, DATE CODE, OR DATE OF MANUFACTURE.

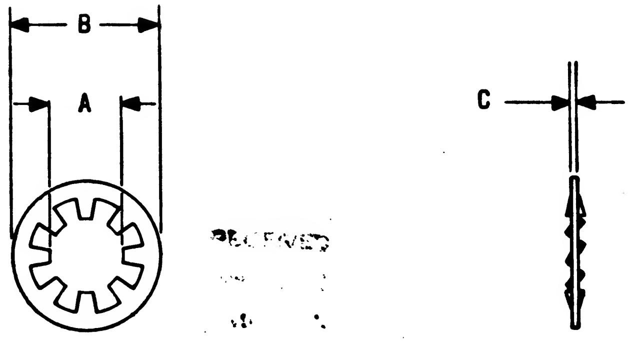
2. INSPECTION AND ACCEPTANCE:

A. DIMENSIONS: AS SHOWN IN TABLE.

3. DESIGN

A. MATERIAL: CORROSION RESISTANT STEEL PER FED. STD. NO. 66, STEEL NO. 410.

B. FINISH: PASSIVATE PER MIL-F-14072, E300.



NASA DASH NUMBER	DIMENSIONS		
	A	B	C
-001	.375	.500	.022
-002	.500	.625	.025
-003	.569	.685	.017

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.007 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS9-497
DRAWN R. W. Turner DATE 24 JUN 63
CHECKED Wilson 26 June 63
APPROVAL
APPROVAL
NASA APPROVAL 6/21/65
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WASHER-LOCK
(INTERNAL TOOTH)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010635
SCALE NONE
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010635 B

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 0274	8/21/63	
A	REVISED PER TDRR 20241	7/28/65	
B	REVISED PER TDRR 23958	11/16/65	

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

C. MARKING:

(1) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION: SUPPLIER'S NAME, NASA PART NUMBER AND REVISION LETTER, SUPPLIER'S LOT OR SERIAL NUMBER, DATE CODE, OR DATE OF MANUFACTURE.

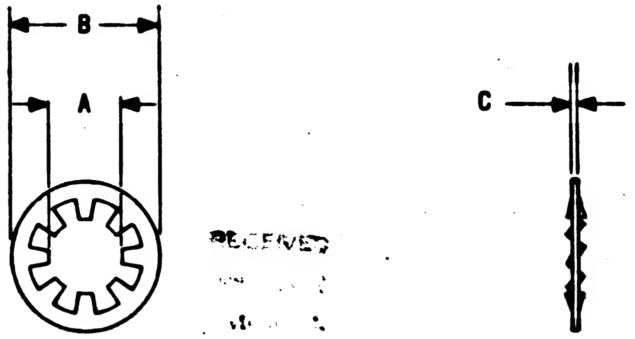
2. INSPECTION AND ACCEPTANCE:

A. DIMENSIONS: AS SHOWN IN TABLE.

3. DESIGN

A. MATERIAL: CORROSION RESISTANT STEEL PER FED. STD. NO. 66, STEEL NO. 410.

B. FINISH: PASSIVATE PER MIL-F-14072, E300.



NASA DASH NUMBER	DIMENSIONS A	DIMENSIONS B	DIMENSIONS C
-001	.375	.500	.022
-002	.500	.625	.025
-003	.569	.685	.017
-004	1.262	1.437	.015

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.007 ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO
CONTRACT NAS9-497

DRAWN DATE 24 JUN 63
CHECKED Wilson H June 63
APPROVAL
APPROVAL
NASA APPROVAL 4/21/65
MIT APPROVAL 8/21/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WASHER-LOCK
(INTERNAL TOOTH)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010635
SCALE NONE
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010635

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02741	8/21/68	

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

INSPECTION AND ACCEPTANCE:

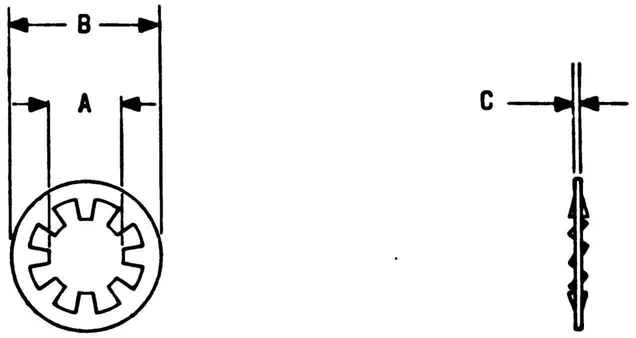
MATERIAL: CORROSION RESISTANT STEEL PER FED. STD. NO. 66, STEEL NO. 410.

FINISH: PASSIVATE PER MIL-F-14072, E300.

DIMENSIONS: AS SHOWN IN TABLE.

MARKING:

PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION: SUPPLIER'S NAME, NASA PART NUMBER AND REVISION LETTER, SUPPLIER'S LOT OR SERIAL NUMBER, DATE CODE, OR DATE OF MANUFACTURE.



NASA DASH NUMBER	DIMENSIONS A	B	C
-001	.375	.500	.022
-002	.500	.625	.025

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.007 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT NAS9-497
DRAWN R.H. Turner DATE 24 JUN 63
CHECKED Wilson 4 June 63
APPROVAL
APPROVAL
NASA APPROVAL 2/21/68
MIT APPROVAL D Hoag 8/21/68

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WASHER-LOCK
(INTERNAL TOOTH)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010635
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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1010636	A

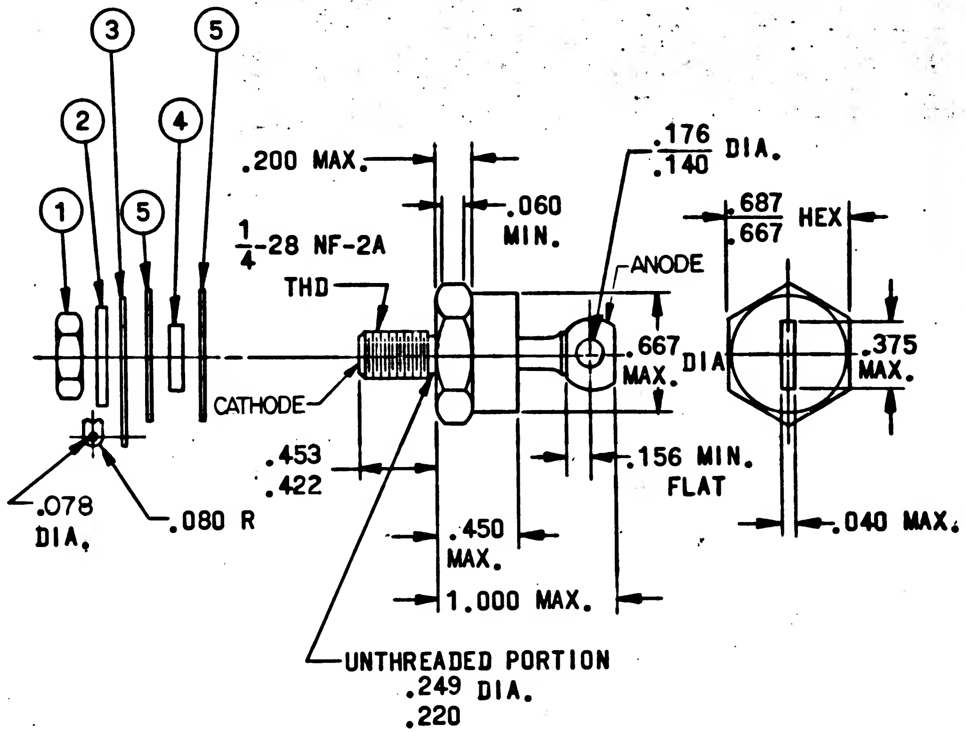
REVISIONS 02927

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02927	5Sep63	WK.
A	REVISED PER TDRR 04246	5P@63	LK RPK WK.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - C. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS IN ND 1002054 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS OF THIS DRAWING. LIFE TEST CONDITIONS SHALL BE THE SAME AS BURN-IN CONDITIONS.
   - D. PACKAGING AND PACKING: UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-P-19491, LEVEL A.
   - E. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-P-19491 AND SHALL INCLUDE THE NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL AND FINISH: ANODE TERMINAL: STEEL WITH A 100% TIN ELECTROPLATE
     - 2) MOUNTING HARDWARE: THE FOLLOWING HDW. SHALL BE SUPPLIED WITH EACH PART:
       - 1. 1 - HEX NUT: BRASS, NICKEL PLATED, 1/4-28 .185 THK, .437 ACROSS FLATS, .500 ACROSS COR.
       - 2. 1 - METAL WASHER: NICKEL OR SILVER PLATED, .625 O.D., .047 THK.
       - 3. 1 - BASE SOLDER LUG - COPPER WITH A 100% TIN ELECTROPLATE, .016 THK.
       - 4. 1 - SPACER WASHER: TEFLON, .315 O.D. .260 I.D., .050 THK.
       - 5. 2 - INSULATING WASHER: MICA (SHALL WITHSTAND 600 VOLTS RMS WITHOUT BREAKDOWN).
     - 3) MARKING:
       - A. THE MANUFACTURER'S NAME OR SYMBOL AND THE NASA (LAST THREE DIGITS) DRAWING NUMBER, DASH NUMBER, REVISION LETTER AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER MIL-STD-130. THE MANUFACTURER'S TYPE DESIGNATION, DATE CODE AND LOT CODE MAY BE MARKED ON THE PART.
   - B. ELECTRICAL REQUIREMENTS: (PER TABLE I)
     - 1) FORWARD VOLTAGE DROP
     - 2) REVERSE CURRENT AT 25°C CASE TEMP.



A	A	A
—	—	—
SHEET 1	SHEET 2	SHEET 3
REVISION STATUS OF SHEETS		

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 .005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG NO CONTRACT NAS9-497

DRAWN Neussert DATE 29 JUL 63
CHECKED WILSON 1AUG 63
APPROVAL D. G. Test 9-5-63
APPROVAL

NASA APPROVAL W. J. Dur Jr. 7/5/63

MIT APPROVAL W. [illegible] 5Sep63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SEMICONDUCTOR DEVICE - DIODE
(SILICON, METAL CASE,
STUD MOUNTED)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010636
SCALE NONE
WT
SHEET 1 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 02927

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02927	5 Sep 63	
A	REVISED PER TDRR 04246	5 Mar 63	LK

3. DESIGN REQUIREMENTS:
   - A. OPERATING AND STORAGE TEMPERATURE: -65°C TO +200°C.
   - B. ELECTRICAL RATING: PER TABLE I
     - 1) MAX. JUNCTION TEMP: +200°C.
     - 2) MIN. JUNCTION TEMP: -65°C.
   - C. THERMAL RESISTANCE: 1.5° C/W MAXIMUM, JUNCTION-TO-STUD
   - D. DESIGN AND CONSTRUCTION: PER FIG. 1
   - E. MOUNTING POSITION: SHALL MEET ALL REQUIREMENTS IN ANY POSITION
   - F. MOUNTING TORQUE: UNIT MUST NOT BE DAMAGED BY TORQUE OF 30 IN.-LB. APPLIED TO 1/4-28NF-2A NUT ASSEMBLED ON THREAD

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
     - 1) CASE TEMPERATURE: 175° ± 5°C WITH 200 VOLTS PEAK INVERSE VOLTAGE APPLIED.
   - B. THE MANUFACTURE SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
     - 1) FORWARD VOLTAGE DROP (T_C = 25°C PER TABLE 1)
     - 2) REVERSE CURRENT (T_C = 25°C PER TABLE 1)
   - C. BURN-IN DATA SHALL BE INCLUDED WITH EACH SHIPMENT.
     - 1) THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL RECTIFIER WITH THE INITIAL TEST READING, THE FINAL READING, AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF THE ABSOLUTE VALUE OF EACH CHARACTERISTIC AND TO SHOW THE FREQUENCY DISTRIBUTION OF THE PERCENT CHANGE OF EACH CHARACTERISTIC FROM ITS INITIAL READING. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR WHICH EXCEED THE SPECIFIED LIMITS FOR PARAMETRIC CHANGES FOLLOWING BURN-IN SHALL NOT BE ACCEPTABLE.
   - D. PARAMETRIC CHANGE LIMITS:
     - 1) FORWARD VOLTAGE DROP: .1 VOLT MAX. CHANGE
     - 2) REVERSE CURRENT: 50u AMPS MAX.CHANGE

NOTES:

1. MOUNTING TORQUE FOR INSPECTION PURPOSE SHALL NOT BE LESS THAN 25 INCH-POUNDS OR GREATER THAN 30 INCH-POUNDS.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS9-497
DRAWN Weissert DATE 29-Jul-63
CHECKED WILSON 1AUG 63
APPROVAL 9-5-63
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SEMICONDUCTOR DEVICE - DIODE
(SILICON, METAL CASE,
STUD MOUNTED)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010636
SCALE
WT
SHEET 2 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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A 1010636

REVISIONS 02927			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02927	5 Sep 63	WK
A	REVISED PER TDRR 04246	5 Nov 63	LK RPK WK

TABLE I (SEE NOTE 1)

NASA PART NUMBER	EIA TYPE (FOR REF ONLY)	PEAK INVERSE VOLTAGE - Vr	AVG FORWARD CURRENT @ $T_C = 145°C - I_{O,1\phi}$	FORWARD VOLTAGE DROP @25ADC @ $T_C = 25°C - V_F$	REVERSE CURRENT @ Vr-I_{RO} $T_C = 25°C$	$T_C = 145°C$	AVG. FORWARD VOLTAGE @ $T_C = 145°C - I_O - 10$
		V MAX 1ϕ	A MAX.	VDC MAX.	MA MAX	MA MAX	VOLTS MAX
1010636-1	IN2156	200	25.0	1.2	1.5	4.0	0.60

TABLE I (CONTINUED)

RMS VOLTAGE V_{RMS}		SURGE CURRENT-i_f @FULL LOAD FOR 8.3 m sec	MAXIMUM POWER DISSIPATION $T_C = 25°C$, DC OR 1ϕ
VAC MAX		A MAX	WATTS
140		400	29.0

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR. DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT NAS-9-197
DRAWN Weissett DATE 29-JUL-63
CHECKED WILSON 1AUG 63
APPROVAL 9-5-63
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SEMICONDUCTOR DEVICE - DIODE
(SILICON, METAL CASE,
STUD MOUNTED)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1010636
SCALE | WT | SHEET 3 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

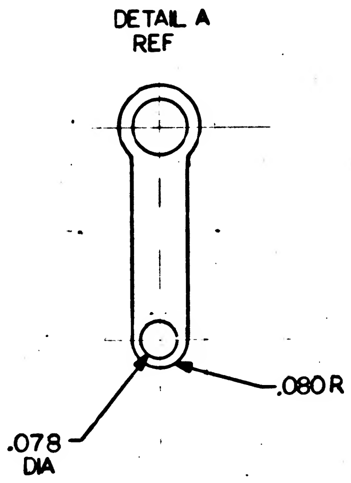
B 1010636

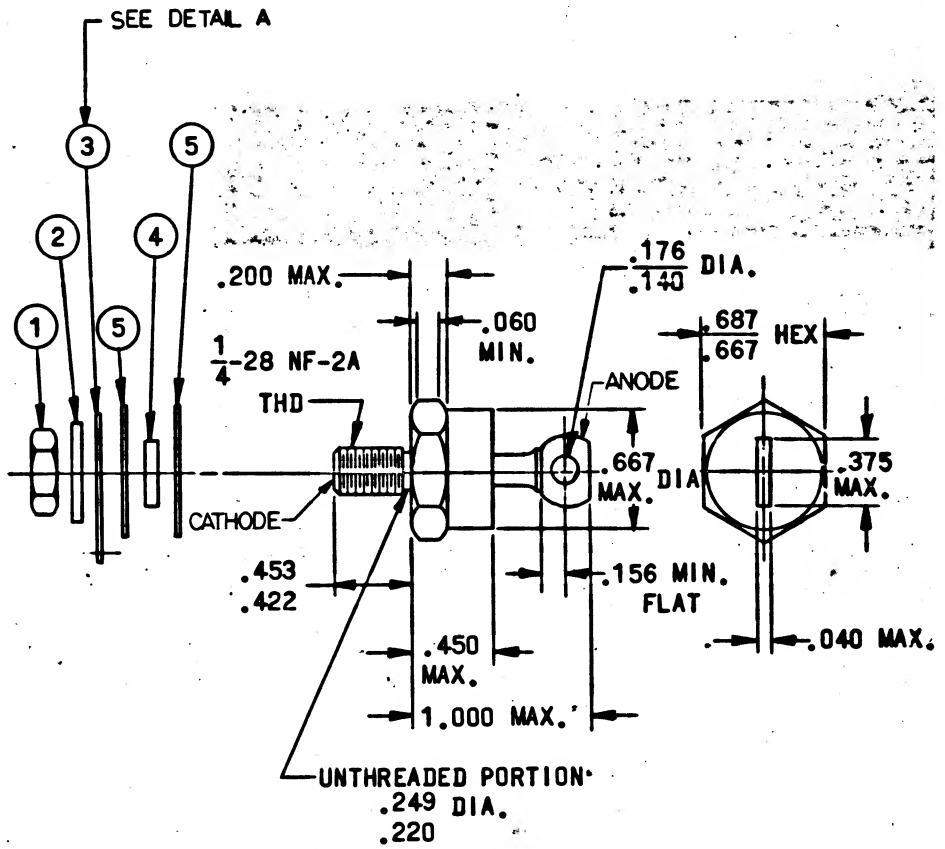
SYM	DESCRIPTION	DATE	APPROVAL
	REVISIONS 02927		
-	INITIAL RELEASE CLASS A PER TDRR 02927	5 Sep 63	WK
A	REVISED PER TDRR 04246	5 Nov 63	LK RPK WK
B	REVISED PER TDRR 04404	11/14/63	RPK WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - C. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS IN ND 1002054 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS OF THIS DRAWING. LIFE TEST CONDITIONS SHALL BE THE SAME AS BURN-IN CONDITIONS.
   - D. PACKAGING AND PACKING: UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-S-19491, LEVEL A.
   - E. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-S-19491 AND SHALL INCLUDE THE NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL AND FINISH: ANODE TERMINAL: STEEL WITH A 100% TIN ELECTROPLATE
     - 2) MOUNTING HARDWARE: THE FOLLOWING HDW. SHALL BE SUPPLIED WITH EACH PART:
       - 1. 1 - HEX NUT: BRASS, NICKEL PLATED, 1/4-28 .185 THK, .437 ACROSS FLATS, .500 ACROSS COR.
       - 2. 1 - METAL WASHER: NICKEL OR SILVER PLATED, .625 O.D., .047 THK.
       - 3. 1 - BASE SOLDER LUG - COPPER WITH A 100% TIN ELECTROPLATE, .016 THK.
       - 4. 1 - SPACER WASHER: TEFLON, .315 O.D. .260 I.D., .050 THK.
       - 5. 2 - INSULATING WASHER: MICA (SHALL WITHSTAND 600 VOLTS RMS WITHOUT BREAKDOWN).
     - 3) MARKING:
       - A. THE MANUFACTURER'S NAME OR SYMBOL AND THE NASA (LAST THREE DIGITS) DRAWING NUMBER, DASH NUMBER, REVISION LETTER AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND1002019 THE MANUFACTURER'S TYPE DESIGNATION, DATE CODE AND LOT CODE MAY BE MARKED ON THE PART.
   - B. ELECTRICAL REQUIREMENTS: (PER TABLE I)
     - 1) FORWARD VOLTAGE DROP
     - 2) REVERSE CURRENT AT 25°C CASE TEMP.





B	A	A
A	A	A
—	—	—
SHEET 1	SHEET 2	SHEET 3

REVISION STATUS OF SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 .005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT NAS9-497
DRAWN Weissert DATE 29-JUL-63
CHECKED WILSON 1AUG 63
APPROVAL D. [illegible] 9-5-63
APPROVAL
NASA APPROVAL W. J. [illegible] 9/5/63
MIT APPROVAL [illegible] 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SEMICONDUCTOR DEVICE - DIODE
(SILICON, METAL CASE,
STUD MOUNTED)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010636
SCALE NONE
WT
SHEET 1 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

C 1010636

REVISIONS 02927			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02927	5Aug63	WK
A	REVISED PER TDRR 04246	5Dec63	RPK WK
B	REVISED PER TDRR 04404	11/12/63	RPK WK
C	REVISED PER TDRR 10538	6/29/64	WK

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REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - C. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS IN ND 1002054 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS OF THIS DRAWING. LIFE TEST CONDITIONS SHALL BE THE SAME AS BURN-IN CONDITIONS.
   - D. PACKAGING AND PACKING: UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-S-19491, LEVEL A.
   - E. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-STD-129 AND SHALL INCLUDE THE NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL AND FINISH: ANODE TERMINAL: STEEL WITH A 100% TIN ELECTROPLATE
     - 2) MOUNTING HARDWARE: THE FOLLOWING HDW. SHALL BE SUPPLIED WITH EACH PART:
       - 1. 1 - HEX NUT: BRASS, NICKEL PLATED, 1/4-28 .185 THK, .437 ACROSS FLATS, .500 ACROSS COR.
       - 2. 1 - METAL WASHER: NICKEL OR SILVER PLATED, .625 O.D., .047 THK.
       - 3. 1 - BASE SOLDER LUG - COPPER WITH A 100% TIN ELECTROPLATE, .016 THK.
       - 4. 1 - SPACER WASHER: TEFLON, .315 O.D. .260 I.D., .050 THK.
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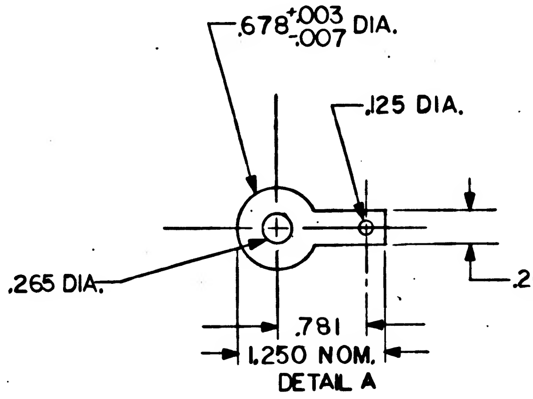
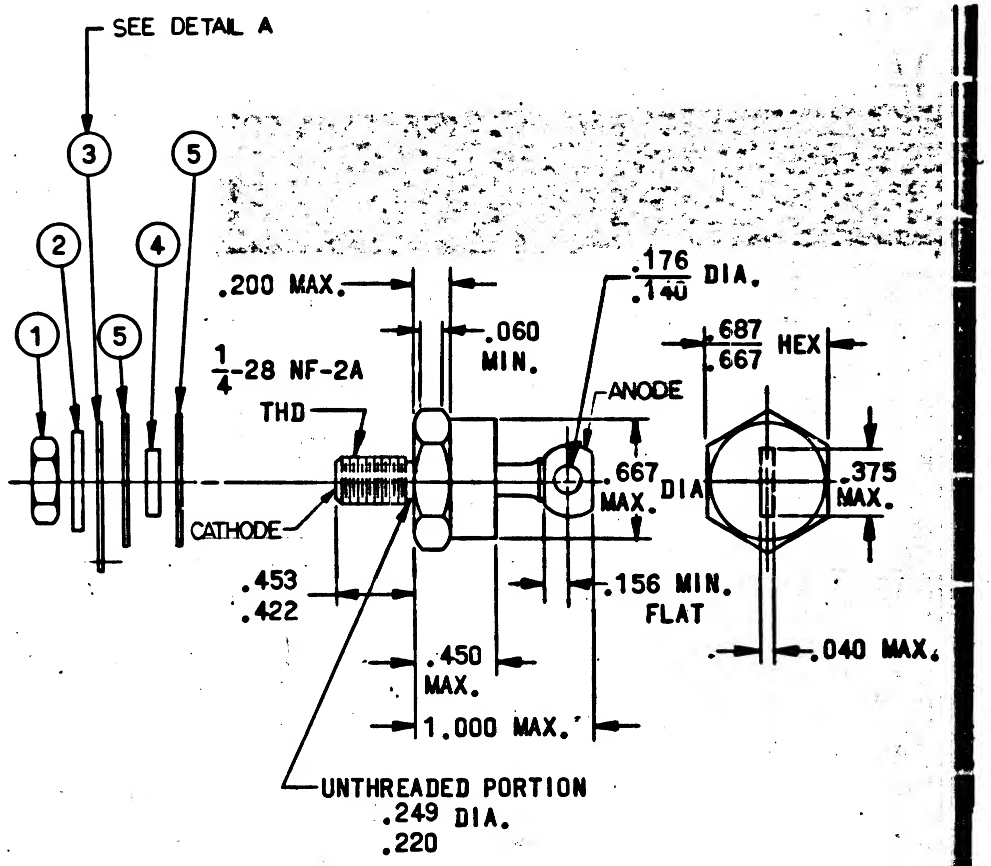
   - B. ELECTRICAL REQUIREMENTS: (PER TABLE I)
     - 1) FORWARD VOLTAGE DROP
     - 2) REVERSE CURRENT AT 25°C CASE TEMP.





PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT NAS9-497
DRAWN Weissert DATE 29-JUL-63
CHECKED WILSON 1 AUG 63
APPROVAL D. A. Teed 9-5-63
APPROVAL
NASA APPROVAL W. J. Sawyer Jr. 9/5/63
MIT APPROVAL W. Kupfer 5Aug63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SEMICONDUCTOR DEVICE - DIODE
(SILICON, METAL CASE,
STUD MOUNTED)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010636
SCALE NONE WT SHEET 1 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS 02927			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02927	5 Sep 63	WL
A	REVISED PER TDRR 04246	5 Mar 63	LK RPK WR
C	REVISED PER TDRR 10538	6/29/64	WLC

3. DESIGN REQUIREMENTS:
   - A. OPERATING AND STORAGE TEMPERATURE: -65°C TO +200°C.
   - B. ELECTRICAL RATING: PER TABLE I
     - 1) MAX. JUNCTION TEMP: +200°C.
     - 2) MIN. JUNCTION TEMP: -65°C.
   - C. THERMAL RESISTANCE: 1.5° C/W MAXIMUM, JUNCTION-TO-STUD
   - D. DESIGN AND CONSTRUCTION: PER FIG. 1
   - E. MOUNTING POSITION: SHALL MEET ALL REQUIREMENTS IN ANY POSITION
   - F. MOUNTING TORQUE: UNIT MUST NOT BE DAMAGED BY TORQUE OF 30 IN.-LB. APPLIED TO 1/4-28NF-2A NUT ASSEMBLED ON THREAD

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
     - 1) CASE TEMPERATURE: 175° ± 5°C WITH 200 VOLTS PEAK INVERSE VOLTAGE APPLIED.
   - B. THE MANUFACTURE SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
     - 1) FORWARD VOLTAGE DROP (T_C = 25°C PER TABLE 1)
     - 2) REVERSE CURRENT (T_C = 25°C PER TABLE 1)
   - C. BURN-IN DATA SHALL BE INCLUDED WITH EACH SHIPMENT.
     - 1) THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL RECTIFIER WITH THE INITIAL TEST READING, THE FINAL READING, AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF THE ABSOLUTE VALUE OF EACH CHARACTERISTIC AND TO SHOW THE FREQUENCY DISTRIBUTION OF THE PERCENT CHANGE OF EACH CHARACTERISTIC FROM ITS INITIAL READING. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR WHICH EXCEED THE SPECIFIED LIMITS FOR PARAMETRIC CHANGES FOLLOWING BURN-IN SHALL NOT BE ACCEPTABLE.
   - D. PARAMETRIC CHANGE LIMITS:
     - 1) FORWARD VOLTAGE DROP: .1 VOLT MAX. CHANGE
     - 2) REVERSE CURRENT: 50u AMPS MAX.CHANGE

NOTES:

1. MOUNTING TORQUE FOR INSPECTION PURPOSE SHALL NOT BE LESS THAN 25 INCH-POUNDS OR GREATER THAN 30 INCH-POUNDS.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ± DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE MASS DWG NO CONTRACT NAS9-497
APPLICATION		MATERIAL	DRAWN Weissert DATE 29 Jul 63 CHECKED WILSON 1AUG 63 APPROVAL D. B. Test 9-5-63 APPROVAL
		HEAT TREATMENT	NASA APPROVAL 9/5/63
		FINAL FINISH	MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SEMICONDUCTOR DEVICE - DIODE
(SILICON, METAL CASE,
STUD MOUNTED)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010636
SCALE	WT	SHEET 2 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS 02927

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02927	5 Sep 63	WK
A	REVISED PER TDRR 04246	5 Nov 63	LK PPK WK
C	REVISED PER TDRR 10538	6/29/64	WK

TABLE I (SEE NOTE 1)

NASA PART NUMBER	EIA TYPE (FOR REF ONLY)	PEAK INVERSE VOLTAGE - Vr	AVG FORWARD CURRENT @ T_C=145°C-I_{O},1ϕ	FORWARD VOLTAGE DROP @25ADC @T_C=25°C - V_F	REVERSE CURRENT @ Vr-I_{RO}		AVG. FORWARD VOLTAGE @T_C=145°C-I_O-10
					T_C=25°C	T_C=145°C	
		V MAX 1ϕ	A MAX.	VDC MAX.	MA MAX	MA MAX	VOLTS MAX
1010636-1	IN2156	200	25.0	1.2	1.5	4.0	0.60

TABLE I (CONTINUED)

RMS VOLTAGE V_{RMS}		SURGE CURRENT-i_f @FULL LOAD FOR 8.3 m sec	MAXIMUM POWER DISSIPATION T_C=25°C, DC OR 1ϕ
VAC MAX		A MAX	WATTS
140		400	29.0

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO
CONTRACT NAS-9 497
DRAWN Weissert DATE 29 Jul 63
CHECKED WILSON 1 AUG 63
APPROVAL 9-5-63
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SEMICONDUCTOR DEVICE - DIODE
(SILICON, METAL CASE,
STUD MOUNTED)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010636
SCALE
WT
SHEET 3 OF 3

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS 02927			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02927	5 Sep 63	WK
A	REVISED PER TDRR 04246	5 Nov 63	RPK WK
B	REVISED PER TDRR 04404	11/14/63	RPK WK
C	REVISED PER TDRR 10538	[illegible]	WK
D	REVISED PER TDRR 13391	10/21/64	[illegible]

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - C. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS IN ND 1002054 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS OF THIS DRAWING. LIFE TEST CONDITIONS SHALL BE THE SAME AS BURN-IN CONDITIONS.
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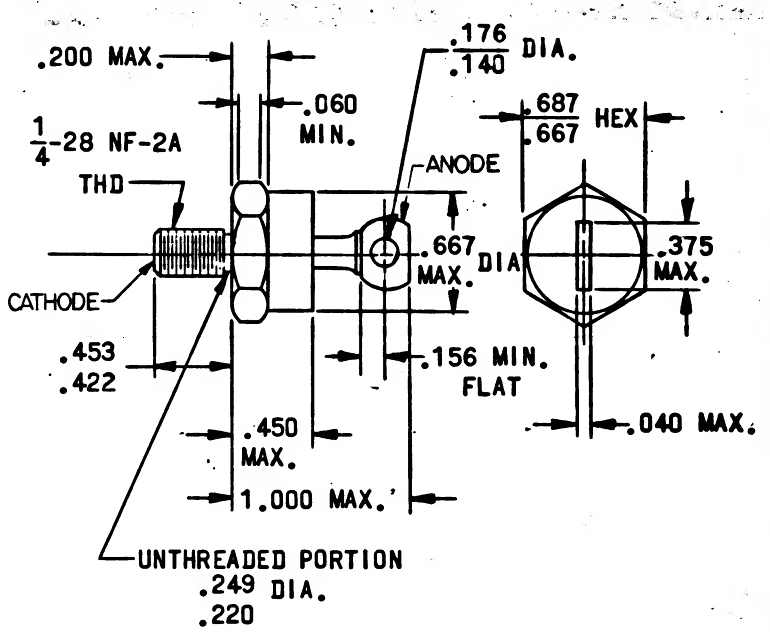
   - E. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-STD-129 AND SHALL INCLUDE THE NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL AND FINISH: ANODE TERMINAL: STEEL WITH A 100% TIN ELECTROPLATE



     - 3) MARKING:
       - A. THE MANUFACTURER'S NAME OR SYMBOL AND THE NASA (LAST THREE DIGITS) DRAWING NUMBER, DASH NUMBER, REVISION LETTER AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND1002019 THE MANUFACTURER'S TYPE DESIGNATION, DATE CODE AND LOT CODE MAY BE MARKED ON THE PART.
   - B. ELECTRICAL REQUIREMENTS: (PER TABLE I)
     - 1) FORWARD VOLTAGE DROP
     - 2) REVERSE CURRENT AT 25°C CASE TEMP.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS.
DWG. NO.
CONTRACT NAS9-497

DRAWN Weissert DATE 29-JUL-63
CHECKED WILSON 1 AUG 63
APPROVAL D. B. Test 9-5-63
APPROVAL
NASA APPROVAL W. J. [illegible] 7-5-63
MIT APPROVAL W. [illegible] 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SEMICONDUCTOR DEVICE - DIODE
(SILICON, METAL CASE,
STUD MOUNTED)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010636
SCALE NONE
WT
SHEET 1 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS 02927

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02927	5 Sep 63	WK
A	REVISED PER TDRR 04246	5 Mar 63	LK RDK WK
C	REVISED PER TDRR 10538	6/29/64	WIL
D	REVISED PER TDRR 13391	6/21/64	

3. DESIGN REQUIREMENTS:
   - A. OPERATING AND STORAGE TEMPERATURE: -65°C TO +200°C.
   - B. ELECTRICAL RATING: PER TABLE I
     - 1) MAX. JUNCTION TEMP: +200°C.
     - 2) MIN. JUNCTION TEMP: -65°C.
   - C. THERMAL RESISTANCE: 1.5° C/W MAXIMUM, JUNCTION-TO-STUD
   - D. DESIGN AND CONSTRUCTION: PER FIG. 1
   - E. MOUNTING POSITION: SHALL MEET ALL REQUIREMENTS IN ANY POSITION
   - F. MOUNTING TORQUE: UNIT MUST NOT BE DAMAGED BY TORQUE OF 30 IN.-LB. APPLIED TO 1/4-28NF-2A NUT ASSEMBLED ON THREAD

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
     - 1) CASE TEMPERATURE: 175° ± 5°C WITH 200 VOLTS PEAK INVERSE VOLTAGE APPLIED.
   - B. THE MANUFACTURE SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
     - 1) FORWARD VOLTAGE DROP (T_C = 25°C PER TABLE 1)
     - 2) REVERSE CURRENT (T_C = 25°C PER TABLE 1)
   - C. BURN-IN DATA SHALL BE INCLUDED WITH EACH SHIPMENT.
     - 1) THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL RECTIFIER WITH THE INITIAL TEST READING, THE FINAL READING, AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. FOR LOT SIZES LARGER THAN 100 PIECES, HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF THE ABSOLUTE VALUE OF EACH CHARACTERISTIC AND TO SHOW THE FREQUENCY DISTRIBUTION OF THE PERCENT CHANGE OF EACH CHARACTERISTIC FROM ITS INITIAL READING. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR WHICH EXCEED THE SPECIFIED LIMITS FOR PARAMETRIC CHANGES FOLLOWING BURN-IN SHALL NOT BE ACCEPTABLE.
   - D. PARAMETRIC CHANGE LIMITS:
     - 1) FORWARD VOLTAGE DROP: .1 VOLT MAX. CHANGE
     - 2) REVERSE CURRENT: 50u AMPS MAX.CHANGE

NOTES:

1. MOUNTING TORQUE FOR INSPECTION PURPOSE SHALL NOT BE LESS THAN 25 INCH-POUNDS OR GREATER THAN 30 INCH-POUNDS.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB CAMBRIDGE MASS
DWG NO
CONTRACT NAS9-497
DRAWN Weissert DATE 29-Jul-63
CHECKED WILSON 1AUG 63
APPROVAL D. B. Test 9-5-63
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SEMICONDUCTOR DEVICE - DIODE (SILICON, METAL CASE, STUD MOUNTED)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010636
SCALE WT SHEET 2 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

D 1010636

REVISIONS 02927

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02927	5 Aug 63	WK
A	REVISED PER TDRR 04246	5 Nov 63	LK RPK WK
C	REVISED PER TDRR 10538	6/29/64	WK
D	REVISED PER TDRR 13391	10/21/64	

TABLE I (SEE NOTE 1)

NASA PART NUMBER	EIA TYPE (FOR REF ONLY)	PEAK INVERSE VOLTAGE - Vr	AVG FORWARD CURRENT @ T_C=145°C-I_O,1⌀	FORWARD VOLTAGE DROP @25ADC @T_C=25°C - V_F	REVERSE CURRENT @ Vr-I_{RO} T_C=25°C	REVERSE CURRENT @ Vr-I_{RO} T_C=145°C	AVG. FORWARD VOLTAGE @T_C=145°C-I_O-10
		V MAX 1⌀	A MAX.	VDC MAX.	MA MAX	MA MAX	VOLTS MAX
1010636-1	IN2156	200	25.0	1.2	1.5	4.0	0.60

TABLE I (CONTINUED)

RMS VOLTAGE V_{RMS}		SURGE CURRENT-i_f @FULL LOAD FOR 8.3 m sec	MAXIMUM POWER DISSIPATION T_C=25°C, DC OR 1⌀
VAC MAX		A MAX	WATTS
140		400	29.0

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR. DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS-9 497
DRAWN Weissett DATE 29-Jul-63
CHECKED WILSON 1AUG 63
APPROVAL D. G. Hoag 9-5-63
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL 5 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SEMICONDUCTOR DEVICE - DIODE
(SILICON, METAL CASE,
STUD MOUNTED)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010636
SCALE
WT
SHEET 3 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

—	1010636

REVISIONS 02927			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02927	5Sep63	WK

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.

UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS IN ND 1002054 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS OF THIS DRAWING. LIFE TEST CONDITIONS SHALL BE THE SAME AS BURN-IN CONDITIONS.

PACKAGING AND PACKING: UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-P-19491, LEVEL A.

MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-P-19491 AND SHALL INCLUDE THE NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

INSPECTION AND ACCEPTANCE:

MECHANICAL REQUIREMENTS:

MATERIAL AND FINISH: ANODE TERMINAL: STEEL WITH A 100% TIN ELECTROPLATE

MOUNTING HARDWARE: THE FOLLOWING HDW. SHALL BE SUPPLIED WITH EACH PART:

1. 1 - HEX NUT: BRASS, NICKEL PLATED, 1/4-28 .185 THK, .437 ACROSS FLATS, .500 ACROSS COR.
2. 1 - METAL WASHER: NICKEL OR SILVER PLATED, .500 O.D., .025 THK.
3. 1 - BASE SOLDER LUG - BERYLLIUM COPPER WITH A 100% TIN ELECTROPLATE, .040 THK.
4. 1 - SPACER WASHER: TEFLON, .315 O.D. .260 I.D., .050 THK.
5. 2 - INSULATING WASHER: MICA (SHALL WITHSTAND 600 VOLTS RMS WITHOUT BREAKDOWN).

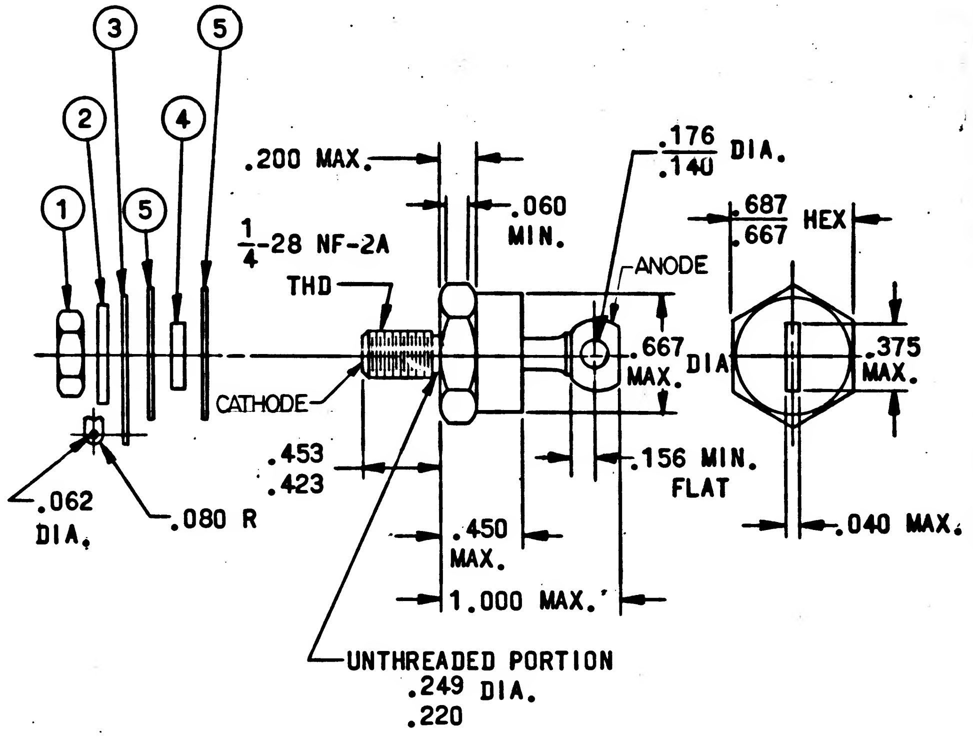
MARKING:

THE MANUFACTURER'S NAME OR SYMBOL AND THE NASA DRAWING NUMBER, DASH NUMBER, REVISION LETTER AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER MIL-STD-130. THE MANUFACTURER'S TYPE DESIGNATION, DATE CODE AND LOT CODE MAY BE MARKED ON THE PART.

ELECTRICAL REQUIREMENTS: (PER TABLE I)

FORWARD VOLTAGE DROP

REVERSE CURRENT AT 25°C CASE TEMP.



—	—	—
SHEET 1	SHEET 2	SHEET 3
REVISION STATUS OF SHEETS		

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± .005 .005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS9-497
DRAWN Weissert DATE 29-JUL-63
CHECKED WILSON 1 AUG 63
APPROVAL D. B. Teal 9-5-63
APPROVAL
NASA APPROVAL 7/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SEMICONDUCTOR DEVICE - DIODE
(SILICON, METAL CASE,
STUD MOUNTED)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010636
SCALE NONE
WT
SHEET 1 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 02927

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02927	5 Sep 63	

DESIGN REQUIREMENTS:

OPERATING AND STORAGE TEMPERATURE: -65°C TO +200°C.

ELECTRICAL RATING: PER TABLE I

MAX. JUNCTION TEMP: +200°C.

MIN. JUNCTION TEMP: -65°C.

THERMAL RESISTANCE: 1.5° C/W MAXIMUM, JUNCTION-TO-STUD

DESIGN AND CONSTRUCTION: PER FIG. 1

MOUNTING POSITION: SHALL MEET ALL REQUIREMENTS IN ANY POSITION

MOUNTING TORQUE: UNIT MUST NOT BE DAMAGED BY TORQUE OF 30 IN.-LB. APPLIED TO 1/4-28NF-2A NUT ASSEMBLED ON THREAD

SPECIAL CONDITIONING BY SUPPLIER:

BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:

AMBIENT TEMPERATURE: 175° ± 5°C WITH 200 VOLTS PEAK INVERSE VOLTAGE APPLIED.

THE MANUFACTURE SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:

FORWARD VOLTAGE DROP
REVERSE CURRENT

BURN-IN DATA SHALL BE INCLUDED WITH EACH SHIPMENT.

THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL RECTIFIER WITH THE INITIAL TEST READING, THE FINAL READING, AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF THE ABSOLUTE VALUE OF EACH CHARACTERISTIC AND TO SHOW THE FREQUENCY DISTRIBUTION OF THE PERCENT CHANGE OF EACH CHARACTERISTIC FROM ITS INITIAL READING. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR WHICH EXCEED THE SPECIFIED LIMITS FOR PARAMETRIC CHANGES FOLLOWING BURN-IN SHALL NOT BE ACCEPTABLE.

PARAMETRIC CHANGE LIMITS:

FORWARD VOLTAGE DROP: .05 VOLT MAX. CHANGE

REVERSE CURRENT: 2X INITIAL VALUE OR 50µA WHICHEVER IS GREATER.

NOTES:

1. MOUNTING TORQUE FOR INSPECTION PURPOSE SHALL NOT BE LESS THAN 25 INCH-POUNDS OR GREATER THAN 30 INCH-POUNDS.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS9-497

DRAWN Weissert DATE 29-Jul-63
CHECKED WILSON 1AUG 63
APPROVAL 9-5-63
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SEMICONDUCTOR DEVICE - DIODE
(SILICON, METAL CASE,
STUD MOUNTED)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010636
SCALE
WT
SHEET 2 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

—	1010636

REVISIONS 02927

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02927	5 Sep 63	WK

TABLE I (SEE NOTE 1)

NASA PART NUMBER	EIA TYPE (FOR REF ONLY)	PEAK INVERSE VOLTAGE - Vr	AVG FORWARD CURRENT @ T_C =145°C-I_{O}, 1Ø	FORWARD VOLTAGE DROP @25ADC @T_C=25°C - V_F	REVERSE CURRENT @ Vr-I_{RO} T_C=25°C	REVERSE CURRENT @ Vr-I_{RO} T_C=145°C	AVG. FORWARD VOLTAGE @T_C=145°C-I_O-10
		V MAX 1Ø	A MAX.	VDC MAX.	MA MAX	MA MAX	VOLTS MAX
1010636-1	IN2156	200	25.0	1.2	2.0	4.0	0.60

TABLE I (CONTINUED)

RMS VOLTAGE V_{RMS}		SURGE CURRENT-i_f @25°C FOR 8.3 m sec	MAXIMUM POWER DISSIPATION T_C=25°C, DC OR 1Ø
VAC MAX		A MAX	WATTS
140		300	29.0

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR. DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT NAS-9 497

DRAWN Weissett DATE 29-JUL-63
CHECKED WILSON 1AUG 63
APPROVAL 9-5-63
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SEMICONDUCTOR DEVICE - DIODE
(SILICON, METAL CASE,
STUD MOUNTED)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010636
SCALE
WT
SHEET 3 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010637	A

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02834		
A	REVISED PER TDRR 05826	W[illegible]64	WK

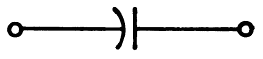
Ⓜ

REQUIREMENT:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS IN ND 1002044 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS OF THIS DRAWING
   - D. UNIT PACKAGING AND PACKING SHALL BE ACCOMPLISHED IN SUCH A MANNER AS TO INSURE THAT EACH INDIVIDUAL PART IS SEPARATED FROM ALL OTHERS AND PACKED SECURELY TO PREVENT CONTACT DURING TRANSIT.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) DIMENSIONS: PER FIGURE I AND TABLE I
     - (2) MARKING: PARTS SHALL BE PERMANENTLY AND LEGIBLY MARKED PER MIL-STD-130 WITH NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER MANUFACTURERS AND SERIAL NUMBER TO INDICATE COMPLETION OF BURN IN. THE MANUFACTURES NAME AND/OR SYMBOL, CAPACITANCE VALVE, TOLERANCE, AND MANUFACTURES PART OR TYPE NUMBER MAY ALSO APPEAR ON PART AND PACKAGE. EACH CONTAINER SHALL BE MARKED WITH THE NASA DRAWING NUMBER AND THE REVISION LETTER.
   - B. ELECTRICAL REQUIREMENTS: TEST PER MIL-C-3965
     - (1) CAPACITANCE: PER TABLE II
     - (2) POWER FACTOR: PER TABLE II
     - (3) DC LEAKAGE CURRENT: PER TABLE II
3. DESIGN REQUIREMENTS:
   - A. OPERATING TEMPERATURE RANGE: -55°C. TO +125°C.
   - B. DC WORKING VOLTAGE: 30 VOLTS AT +125°C.
   - C. MAX CAPACITANCE CHANGE AT -55°C.: -45%
   - D. MAX CAPACITANCE CHANGE AT +125°C.: +75%
   - E. RATED SURGE VOLTAGE: 35 VOLTS DC
4. SPECIAL CONDITIONING BY SUPPLIER
   - A. BURNIN: ALL CAPACITORS SHALL BE BURNED-IN FOR 250 HOURS MINIMUM AT RATED DC VOLTAGE AT A TEMPERATURE OF +125°C. THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN IN:
     - (1) CAPACITANCE
     - (2) POWER FACTOR
     - (3) LEAKAGE CURRENT
   - B. THE BURN IN DATA SHALL BE INCLUDED WITH EACH SHIPMENT. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION BY SERIAL NUMBER OF EACH INDIVIDUAL CAPACITOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER



GRAPHICAL SYMBOL

NOTE: CAPACITOR INSULATED FROM CASE.

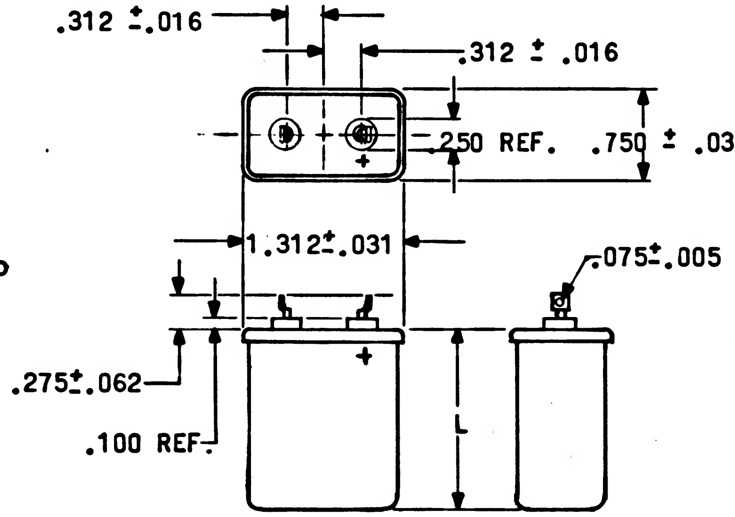


FIG. 1

A	A
—	—
SHEET 1	SHEET 2

REVISION STATUS OF SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±—— DECIMALS ±—— ANGLES ±——
DO NOT SCALE THIS DRAWING

MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG. NO
CONTRACT NAS-9-497

DRAWN R.W. [illegible] DATE 12 AUG 63
CHECKED WILSON 13 AUG 63
APPROVAL D. A. [illegible] 28 AUG 63
APPROVAL
NASA APPROVAL [illegible] 8/[illegible]/63
MIT APPROVAL [illegible] 8/23/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CAPACITOR - FIXED
TANTALUM - FOIL, POLAR
RECTANGULAR, 125°C
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010637
SCALE NONE
WT
SHEET 1 OF 2

RICE

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010637 A

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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02834		
A	REVISED PER TDRR 05826	20 Jan 64	WK

REQUIREMENTS: CONTINUED

MEET THE SPECIFIED REQUIREMENTS. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR WHICH EXCEED THE SPECIFIED LIMITS FOR PARAMETRIC CHANGES FOLLOWING BURN-IN SHALL NOT BE ACCEPTABLE.

(1) PARAMETRIC CHANGE LIMITS:

(2) CAPACITANCE: ±20% OF INITIAL 125°C VALVE.

TABLE I

CASE SIZE	L MAX
10	2.562
20	2.062
30	1.437

TABLE II

NASA PART NUMBER	CASE SIZE	CAPACITANCE (UF) AT 25°C AND 120 CPS	MAX POWER FACTOR AT 120 CPS %		MAX DC LEAKAGE CURRENT (UA)		MAX ESR (OHMS) AT 120 CPS AND 25°C
			25°C	125°C	25°C	125°C	
1010637-1	20	550	20	50	58	580	0.58

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT NAS9-497
DRAWN R.W. Turner DATE 12 AUG 63
CHECKED WILSON 13 AUG 63
APPROVAL D. G. Hoag 20 AUG 63
APPROVAL
NASA APPROVAL 1/4/6
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CAPACITOR - FIXED
TANTALUM - FOIL, POLAR
RECTANGULAR, 125°C
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1010637
SCALE — | WT | SHEET 2 OF 2

RICE

MASTER

B	1010637

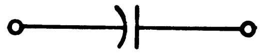
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS				
	SYM	DESCRIPTION	DATE	APPROVAL
Ⓜ	-	INITIAL RELEASE CLASS A PER TDRR 02834		
Ⓜ	A	REVISED PER TDRR 05826	W ... 64	WK
	B	REVISED PER TDRR 08517	4 May 64	WK

REQUIREMENT:

1. GENERAL:
   A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327
   B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2
   C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS IN ND 1002044 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS OF THIS DRAWING
   D. UNIT PACKAGING AND PACKING SHALL BE ACCOMPLISHED IN SUCH A MANNER AS TO INSURE THAT EACH INDIVIDUAL PART IS SEPARATED FROM ALL OTHERS AND PACKED SECURELY TO PREVENT CONTACT DURING TRANSIT.
2. INSPECTION AND ACCEPTANCE:
   A. MECHANICAL REQUIREMENTS:
      (1) DIMENSIONS: PER FIGURE I AND TABLE I
      (2) MARKING: PARTS SHALL BE PERMANENTLY AND LEGIBLY MARKED PER ND 1002019 WITH NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER MANUFACTURERS AND SERIAL NUMBER TO INDICATE COMPLETION OF BURN IN. THE MANUFACTURES NAME AND/OR SYMBOL, CAPACITANCE VALVE, TOLERANCE, AND MANUFACTURES PART OR TYPE NUMBER MAY ALSO APPEAR ON PART AND PACKAGE. EACH CONTAINER SHALL BE MARKED WITH THE NASA DRAWING NUMBER AND THE REVISION LETTER.
   B. ELECTRICAL REQUIREMENTS: TEST PER MIL-C-3965
      (1) CAPACITANCE: PER TABLE II
      (2) POWER FACTOR: PER TABLE II
      (3) DC LEAKAGE CURRENT: PER TABLE II
3. DESIGN REQUIREMENTS:
   A. OPERATING TEMPERATURE RANGE: -55°C. TO +125°C.
   B. DC WORKING VOLTAGE: 30 VOLTS AT +125°C.
   C. MAX CAPACITANCE CHANGE AT -55°C.: -45%
   D. MAX CAPACITANCE CHANGE AT +125°C.: +75%
   E. RATED SURGE VOLTAGE: 35 VOLTS DC
4. SPECIAL CONDITIONING BY SUPPLIER
   A. BURNIN: ALL CAPACITORS SHALL BE BURNED-IN FOR 250 HOURS MINIMUM AT RATED DC VOLTAGE AT A TEMPERATURE OF +125°C. THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN IN:
      (1) CAPACITANCE
      (2) POWER FACTOR
      (3) LEAKAGE CURRENT
   B. THE BURN IN DATA SHALL BE INCLUDED WITH EACH SHIPMENT. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION BY SERIAL NUMBER OF EACH INDIVIDUAL CAPACITOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



GRAPHICAL SYMBOL

NOTE: CAPACITOR INSULATED FROM CASE.

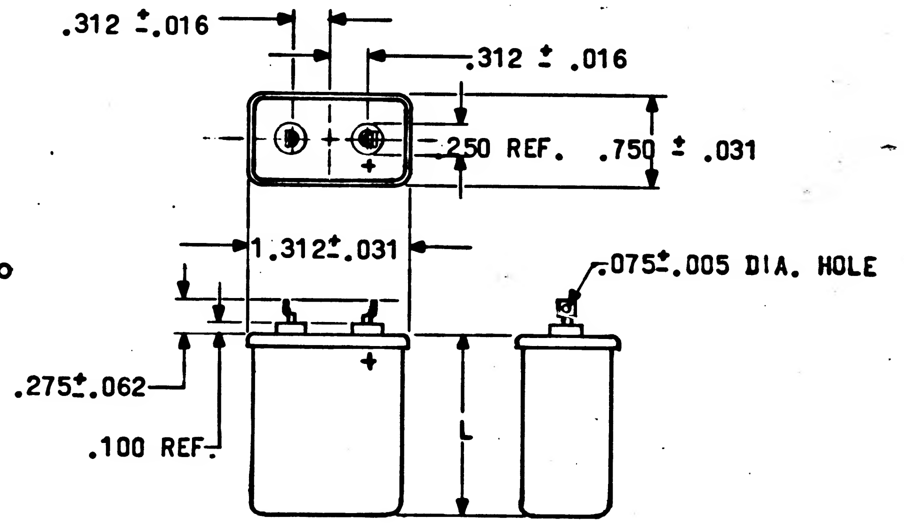


FIG. 1

B	B
A	A
—	—
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT NAS9-497
DRAWN R.W. Dunn DATE 12 AUG 63
CHECKED WILSON 13 AUG 63
APPROVAL D.W. Test 28 AUG 63
APPROVAL
NASA APPROVAL 8/4/63
MIT APPROVAL 8/28/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CAPACITOR - FIXED
TANTALUM - FOIL, POLAR
RECTANGULAR, 125°C
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010637
SCALE NONE WT SHEET 1 OF 2

RICE

MASTER

INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
Ⓜ -	INITIAL RELEASE CLASS A PER TDRR 02834		
A	REVISED PER TDRR 05826	20 Jan 64	WK.
B	REVISED PER TDRR 08517	16 May 64	WK.

REQUIREMENTS: CONTINUED

MEET THE SPECIFIED REQUIREMENTS. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR WHICH EXCEED THE SPECIFIED LIMITS FOR PARAMETRIC CHANGES FOLLOWING BURN-IN SHALL NOT BE ACCEPTABLE.

(1) PARAMETRIC CHANGE LIMITS:

(2) CAPACITANCE: ±20% OF INITIAL 125°C VALVE.

TABLE I

CASE SIZE	L MAX
10	2.562
20	2.062
30	1.437

TABLE II

NASA PART NUMBER	CASE SIZE	CAPACITANCE (UF) AT 25°C AND 120 CPS	MAX POWER FACTOR AT 120 CPS %		MAX DC LEAKAGE CURRENT (UA)		MAX ESR (OHMS) AT 120 CPS AND 25°C
			25°C	125°C	25°C	125°C	
1010637-1	30	550	20	50	58	580	0.58

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS9-497

DRAWN DATE 12 AUG 63
CHECKED WILSON 13 AUG 63
APPROVAL 20 AUG 63
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CAPACITOR - FIXED
TANTALUM - FOIL, POLAR
RECTANGULAR, 125°C
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010637
SCALE —
WT
SHEET 2 OF 2

RICE

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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C 1010637

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02834		
A	REVISED PER TDRR 05826	[illegible] 64	WK
B	REVISED PER TDRR 08517	5 Aug 64	WK
C	REVISED PER TDRR 10043	[illegible] 64	WK

REQUIREMENT:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2
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     - (1) CAPACITANCE: PER TABLE II
     - (2) POWER FACTOR: PER TABLE II
     - (3) DC LEAKAGE CURRENT: PER TABLE II
3. DESIGN REQUIREMENTS:
   - A. OPERATING TEMPERATURE RANGE: -55°C. TO +125°C.
   - B. DC WORKING VOLTAGE: 30 VOLTS AT +125°C.
   - C. MAX CAPACITANCE CHANGE AT -55°C.: -45%
   - D. MAX CAPACITANCE CHANGE AT +125°C.: +75%
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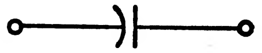
PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



GRAPHICAL SYMBOL

NOTE: CAPACITOR INSULATED FROM CASE.

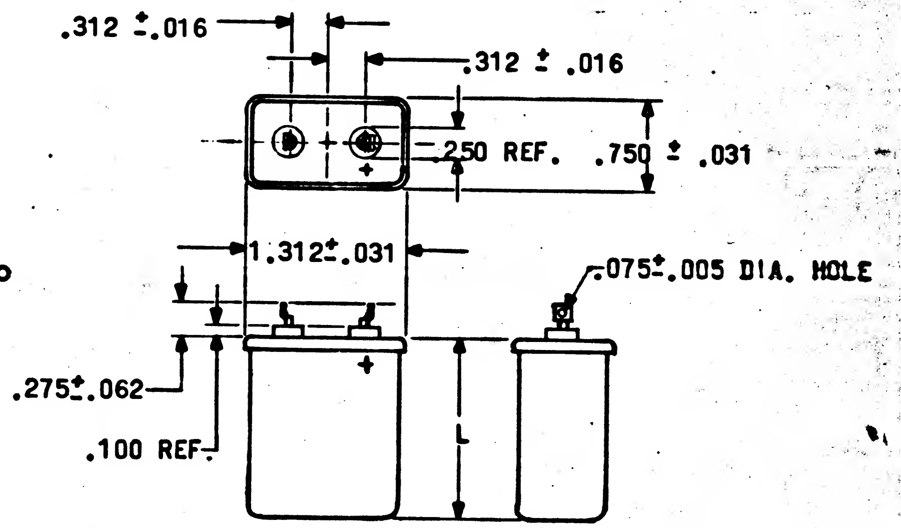


FIG. 1

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS-9-497
DRAWN R.W. [illegible] DATE 12 AUG 63
CHECKED WILSON 13 AUG 63
APPROVAL D. [illegible] 28 AUG 63
APPROVAL
NASA APPROVAL [illegible] 8/14/63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CAPACITOR - FIXED
TANTALUM - FOIL, POLAR
RECTANGULAR, 125°C
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010637
SCALE NONE
WT
SHEET 1 OF 2

RICE

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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1010637 C

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02834		
A	REVISED PER TDRR 05826	20 Jan 64	WK.
B	REVISED PER TDRR 08517	16 May 64	WK.
C	REVISED PER TDRR 10043	6/9/64	WK.

REQUIREMENTS: CONTINUED

MEET THE SPECIFIED REQUIREMENTS. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR WHICH EXCEED THE SPECIFIED LIMITS FOR PARAMETRIC CHANGES FOLLOWING BURN-IN SHALL NOT BE ACCEPTABLE.

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TABLE I

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30	1.437

TABLE II

NASA PART NUMBER	CASE SIZE	CAPACITANCE (UF) AT 25°C AND 120 CPS	MAX POWER FACTOR AT 120 CPS %		MAX DC LEAKAGE CURRENT (UA)		MAX ESR (OHMS) AT 120 CPS AND 25°C
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1010637-1	20	550	20	50	58	580	0.58

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

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CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS9-497

DRAWN R.W. Tuman DATE 12 AUG 63
CHECKED WILSON 13 AUG 63
APPROVAL 20 AUG 63
APPROVAL

NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
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CAPACITOR - FIXED
TANTALUM - FOIL, POLAR
RECTANGULAR, 125°C
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010637
SCALE —
WT
SHEET 2 OF 2

MASTER

RICE

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010637 D

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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02834		
A	REVISED PER TDRR 05826	[illegible] 64	WK
B	REVISED PER TDRR 08517	15 May 64	WK
C	REVISED PER TDRR 10043	6/9/64	WK
D	REVISED PER TDRR 17931	[illegible]/65	WR

REQUIREMENT:

1. GENERAL:
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   B. ELECTRICAL REQUIREMENTS: TEST PER MIL-C-3965
      (1) CAPACITANCE AND CAPACITANCE TOLERANCE: PER TABLE II
      (2) POWER FACTOR: PER TABLE II
      (3) DC LEAKAGE CURRENT: PER TABLE II
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   B. DC WORKING VOLTAGE: 30 VOLTS AT +125°C.
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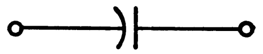

GRAPHICAL SYMBOL

NOTE: CAPACITOR INSULATED FROM CASE.

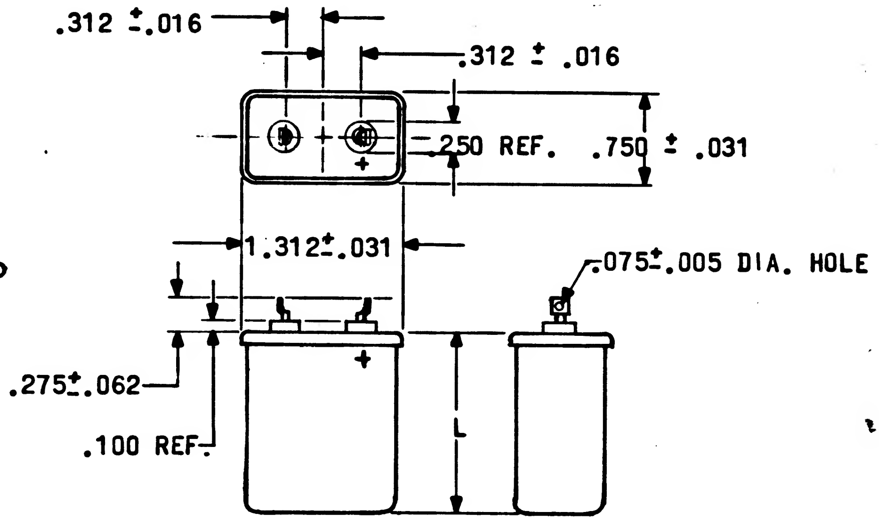

FIG. 1

MASTER

NEXT ASSY	USED ON
APPLICATION	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO
CONTRACT NAS-9-497
DRAWN R.W. Duncan DATE 12AUG63
CHECKED WILSON 13 AUG 63
APPROVAL D. W. Test 28 AUG 63
APPROVAL
NASA APPROVAL [illegible] 8/4/63
MIT APPROVAL R. E. [illegible] 8/28/63

MANNED SPACECRAFT CENTER
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CAPACITOR - FIXED
TANTALUM - FOIL, POLAR
RECTANGULAR, 125°C
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010637
SCALE NONE
WT
SHEET 1 OF 2

RICE

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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
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A	REVISED PER TDRR 05826	20 Jan 64	WK
B	REVISED PER TDRR 08517	15 May 64	WK
C	REVISED PER TDRR 10043	6/9/64	WK
D	REVISED PER TDRR 17931	4/27/65	WK

REQUIREMENTS: CONTINUED

MEET THE SPECIFIED REQUIREMENTS. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR WHICH EXCEED THE SPECIFIED LIMITS FOR PARAMETRIC CHANGES FOLLOWING BURN-IN SHALL NOT BE ACCEPTABLE.

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TABLE I

CASE SIZE	L MAX
10	2.562
20	2.062
30	1.437

TABLE II

NASA PART NUMBER	CASE SIZE	CAPACITANCE -15%+50% (U F) AT 25°C AND 120 CPS	MAX POWER FACTOR AT 120 CPS %		MAX DC LEAKAGE CURRENT (UA)		MAX ESR (OHMS) AT 120 CPS AND 25°C
			25°C	125°C	25°C	125°C	
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MASTER

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LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
CONTRACT NAS9-497
DWG. NO.
DRAWN DATE 12 AUG 63
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APPROVAL 20 AUG 63
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MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CAPACITOR - FIXED
TANTALUM - FOIL, POLAR
RECTANGULAR, 125°C
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CODE IDENT NO.
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NASA DRAWING NO. 1010637
SCALE —
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SHEET 2 OF 2

RICE

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

-	1010637

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02834		

REQUIREMENT:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327

SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2

UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS IN ND 1002044 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS OF THIS DRAWING

UNIT PACKAGING AND PACKING SHALL BE ACCOMPLISHED IN SUCH A MANNER AS TO INSURE THAT EACH INDIVIDUAL PART IS SEPARATED FROM ALL OTHERS AND PACKED SECURELY TO PREVENT CONTACT DURING TRANSIT.

INSPECTION AND ACCEPTANCE:

MECHANICAL REQUIREMENTS:

DIMENSIONS: PER FIGURE I AND TABLE I

MARKING: PARTS SHALL BE PERMANENTLY AND LEGIBLY MARKED PER MIL-STD-130 WITH NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER MANUFACTURERS AND SERIAL NUMBER TO INDICATE COMPLETION OF BURN IN. THE MANUFACTURERS NAME AND/OR SYMBOL, CAPACITANCE VALVE, TOLERANCE, AND MANUFACTURES PART OR TYPE NUMBER MAY ALSO APPEAR ON PART AND PACKAGE. EACH CONTAINER SHALL BE MARKED WITH THE NASA DRAWING NUMBER AND THE REVISION LETTER.

ELECTRICAL REQUIREMENTS: TEST PER MIL-C-3965

CAPACITANCE: PER TABLE II

POWER FACTOR: PER TABLE II

DC LEAKAGE CURRENT: PER TABLE II

DESIGN REQUIREMENTS:

OPERATING TEMPERATURE RANGE: -55°C. TO +125°C.

DC WORKING VOLTAGE: 30 VOLTS AT +125°C.

MAX CAPACITANCE CHANGE AT -55°C.: -45%

MAX CAPACITANCE CHANGE AT +125°C.: +75%

RATED SURGE VOLTAGE: 35 VOLTS DC

SPECIAL CONDITIONING BY SUPPLIER

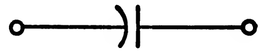
BURNIN: ALL CAPACITORS SHALL BE BURNED-IN FOR 250 HOURS MINIMUM AT RATED DC VOLTAGE AT A TEMPERATURE OF +125°C. THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN IN:

CAPACITANCE
POWER FACTOR
LEAKAGE CURRENT

THE BURN IN DATA SHALL BE INCLUDED WITH EACH SHIPMENT. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION BY SERIAL NUMBER OF EACH INDIVIDUAL CAPACITOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER



GRAPHICAL SYMBOL

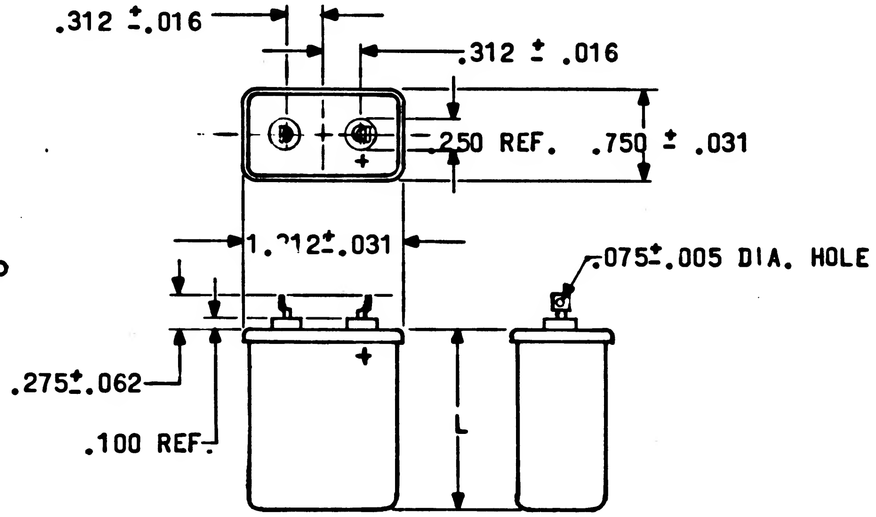


FIG. 1

—	—
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG. NO
CONTRACT NAS-9-497
DRAWN R.W. [illegible] DATE 12 AUG 63
CHECKED WILSON 13 AUG 63
APPROVAL D.W. [illegible] 28 AUG 63
APPROVAL
NASA APPROVAL [illegible] 8/4/63
MIT APPROVAL [illegible] 8/28/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CAPACITOR - FIXED
TANTALUM - FOIL, POLAR
RECTANGULAR, 125°C
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010637
SCALE NONE
WT
SHEET 1 OF 2

1010637

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

— 1010637

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02834		

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS: CONTINUED

MEET THE SPECIFIED REQUIREMENTS. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR WHICH EXCEED THE SPECIFIED LIMITS FOR PARAMETRIC CHANGES FOLLOWING BURN-IN SHALL NOT BE ACCEPTABLE.

PARAMETRIC CHANGE LIMITS:
CAPACITANCE: ±20% OF INITIAL 125°C VALVE.

TABLE I

CASE SIZE	L MAX
10	2.562
20	2.062
30	1.437

TABLE II

NASA PART NUMBER	CASE SIZE	CAPACITANCE (UF) AT 25°C AND 120 CPS	MAX POWER FACTOR AT 120 CPS %		MAX DC LEAKAGE CURRENT (UA)		MAX ESR (OHMS) AT 120 CPS AND 25°C
			25°C	125°C	25°C	125°C	
1010637-1	20	550	20	50	58	580	0.58

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT NAS9-497

DRAWN DATE 12 AUG 63
CHECKED WILSON 13 AUG 63
APPROVAL 20 AUG 63
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CAPACITOR - FIXED
TANTALUM - FOIL, POLAR
RECTANGULAR, 125°C
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010637
SCALE — WT SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010637

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010638 A

REVISIONS 02927			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02927	5 Sep 63	WK
A	REVISED PER TDRR 04215	24 Oct 63	WK

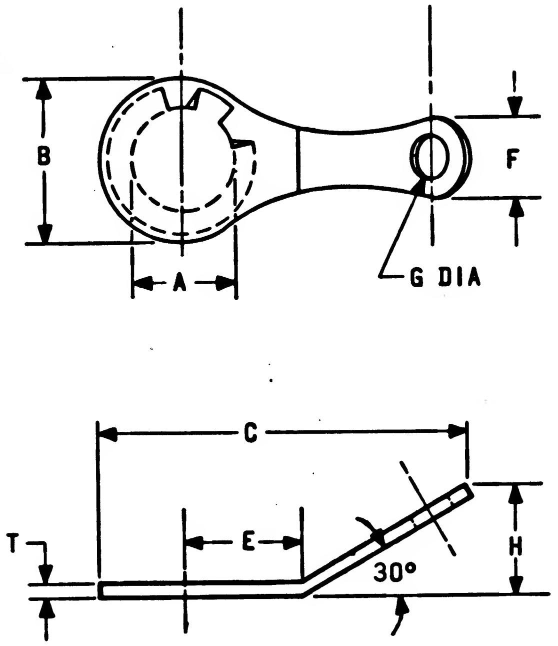
REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: PHOSPHOR BRONZE ALLOY
     - (2) FINISH: HOT SOLDER DIP.
     - (3) DIMENSIONS: AS PER DRAWING.
     - (4) MARKING:
       - (a) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME
         - NASA PART NUMBER, DASH NUMBER, AND REVISION LETTER

       MANUFACTURER'S PART NUMBER, DATE CODE, OR DATE OF MANUFACTURE MAY APPEAR ON THE PART OR PACKAGE.

NASA PART NUMBER	SIZE SCREW (REF)	"A" DIA MAX	"A" DIA MIN	B	C	E	F	G DIA	H	T THICKNESS
-1, -2, -3	NOT AVAILABLE									
1010638-4	4	.123	.116	.31	.81	.27	.17	.09	.23	.018
-5	5	.136	.129	.31	.81	.27	.17	.09	.23	.018
-6	6	.150	.142	.31	.81	.27	.17	.09	.23	.018
-7	NOT AVAILABLE									
-8	8	.176	.168	.31	.81	.27	.17	.09	.23	.018
-9	NOT AVAILABLE									
-10	10	.204	.195	.34	.83	.27	.17	.09	.23	.018



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ——
DECIMALS ±.005 ±.02
ANGLES ±.5°
DO NOT SCALE THIS DRAWING

MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH SEE REQUIREMENTS

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO
CONTRACT NAS 9-497

DRAWN D. Malley DATE 21 AUG 63
CHECKED WILSON 21 AUG 63
APPROVAL D. R. Test 9-5-63
APPROVAL
NASA APPROVAL W. S. Swartz 9/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL - LUG,
SOLDER, 30° ANGLE

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010638
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010638 B

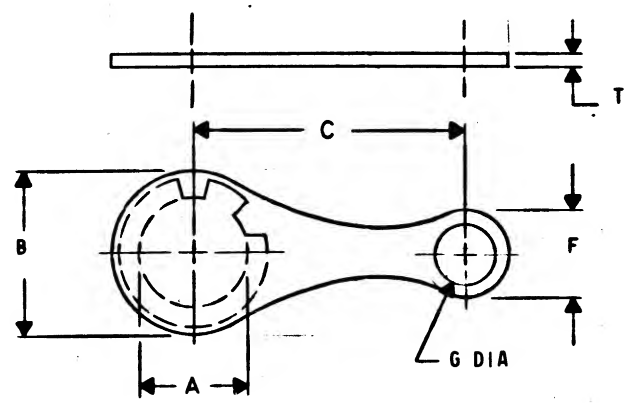
SYM	DESCRIPTION	DATE	APPROVAL
	REVISIONS 02927		
-	INITIAL RELEASE CLASS A PER TDRR 02927	5 Sep 63	WK
A	REVISED PER TDRR 04215	24 Oct 63	WK
B	REVISED PER TDRR 05324	27 Dec 63	WK

REQUIREMENTS:

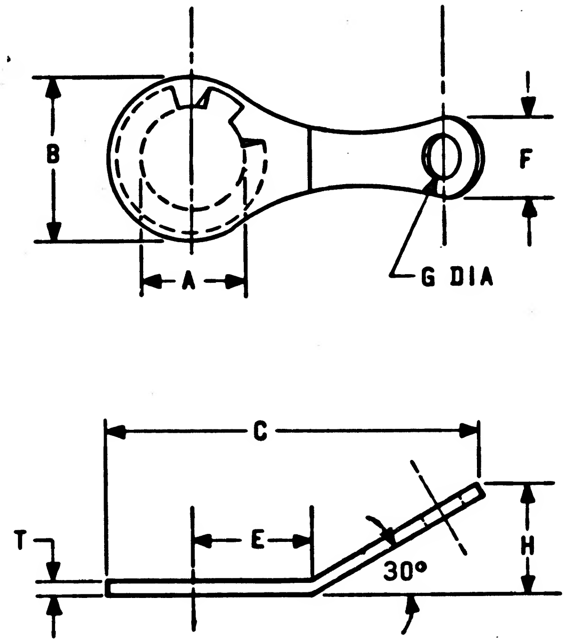
1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: PHOSPHOR BRONZE ALLOY OR BRASS PER QQB-226, PER TABLE 1.
     - (2) FINISH: HOT SOLDER DIP.
     - (3) DIMENSIONS: AS PER DRAWING.
     - (4) MARKING:
       - (a) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME
         - NASA PART NUMBER, DASH NUMBER, AND REVISION LETTER

         MANUFACTURER'S PART NUMBER, DATE CODE, OR DATE OF MANUFACTURE MAY APPEAR ON THE PART OR PACKAGE.



STYLE "B"



STYLE "A"

TABLE 1

NASA PART NUMBER	SIZE SCREW (REF)	"A" DIA MAX	"A" DIA MIN	B	C	E	F	G DIA	H	T THICKNESS	STYLE	MATERIAL
−1, −2, −3	NOT AVAILABLE											PHOSPHOR BRONZE
1010638-4	4	.123	.116	.31	.81	.27	.17	.09	.23	.018	A	"
-5	5	.136	.129	.31	.81	.27	.17	.09	.23	.018	A	"
-6	6	.150	.142	.31	.81	.27	.17	.09	.23	.018	A	"
-7	NOT AVAILABLE										A	"
-8	8	.176	.168	.31	.81	.27	.17	.09	.23	.018	A	"
-9	NOT AVAILABLE										A	"
-10	10	.204	.195	.34	.83	.27	.17	.09	.23	.018	A	"
-11	10	.202	.196	.31	.87	—	.17	.09	—	.018	B	BRASS

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.005 ±.02 ANGLES ±.5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497

DRAWN D. Malley DATE 21 AUG 63
CHECKED Wilson 21 AUG 63
APPROVAL D. R. Test 9-5-63
APPROVAL

NASA APPROVAL 9/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL - LUG,
SOLDER, ANGLE

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010638
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010638 C

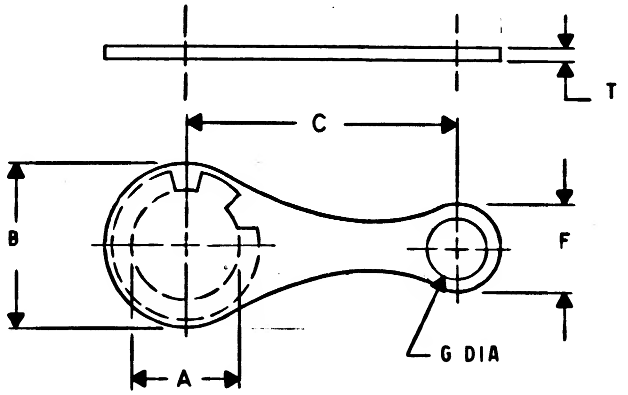
REVISIONS 02927			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02927	5 Sep 63	WK
A	REVISED PER TDRR 04215	24 Oct 63	WK
B	REVISED PER TDRR 05324	27 Dec 63	WK
C	REVISED PER TDRR 22445	11/24/65	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: PHOSPHOR BRONZE ALLOY OR BRASS PER QQB-226, PER TABLE 1.
     - (2) FINISH: HOT SOLDER DIP.
     - (3) DIMENSIONS: AS PER DRAWING.
     - (4) MARKING:
       - (a) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME
         - NASA PART NUMBER, DASH NUMBER, AND REVISION LETTER
         - MANUFACTURER'S PART NUMBER, DATE CODE, OR DATE OF MANUFACTURE MAY APPEAR ON THE PART OR PACKAGE.

TABLE 1

NASA PART NUMBER	SIZE SCREW (REF)	"A" DIA		B	C	E	F	G DIA	H	T THICKNESS	STYLE	MATERIAL
		MAX	MIN									
-1, -2, -3	NOT	AVAILABLE										PHOSPHOR BRONZE
1010638-4	4	.123	.116	.31	.81	.27	.17	.09	.23	.018	A	"
-5	5	.136	.129	.31	.81	.27	.17	.09	.23	.018	A	"
-6	6	.150	.142	.31	.81	.27	.17	.09	.23	.018	A	"
-7	NOT	AVAILABLE									A	"
-8	8	.176	.168	.31	.81	.27	.17	.09	.23	.018	A	"
-9	NOT	AVAILABLE									A	"
-10	10	.204	.195	.34	.83	.27	.17	.09	.23	.018	A	"
-11	10	.202	.196	.31	.87	—	.17	.09	—	.018	B	BRASS
-12	2	.123	.116	.31	.81	.27	.17	.09	.23	.018	A	PHOSPHOR BRONZE



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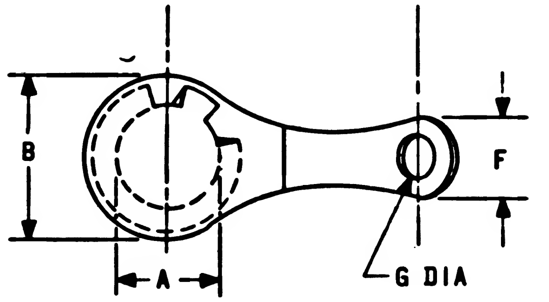
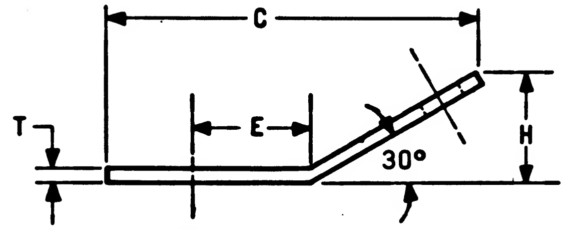




STYLE "A"

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.005 ±.02 ANGLES ±.5°
DO NOT SCALE THIS DRAWING

MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH SEE REQUIREMENTS

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO
CONTRACT NAS 9-497

DRAWN D. Motley DATE 21 AUG 63
CHECKED Wilson 21 AUG 63
APPROVAL D. R. Test 9-5-63
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL 5/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL - LUG,
SOLDER, ANGLE

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010638
SCALE NONE
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010638 D

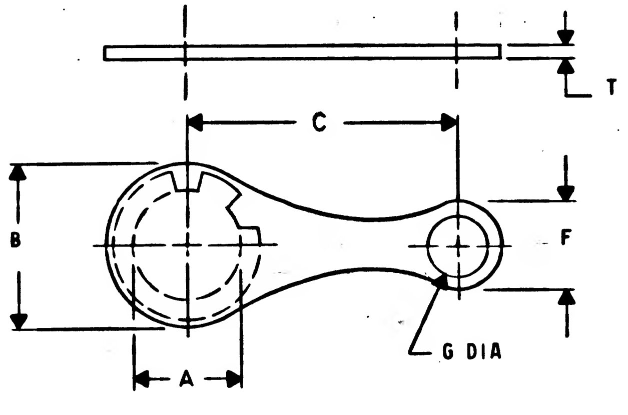
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02927	5Sep63	WK
A	REVISED PER TDRR 04215	24Oct63	WK
B	REVISED PER TDRR 05324	27Dec63	WK
C	REVISED PER TDRR 22445	1/26/65	WK
D	REVISED PER TDRR 23459	11/4/65	WK

REVISIONS 02927

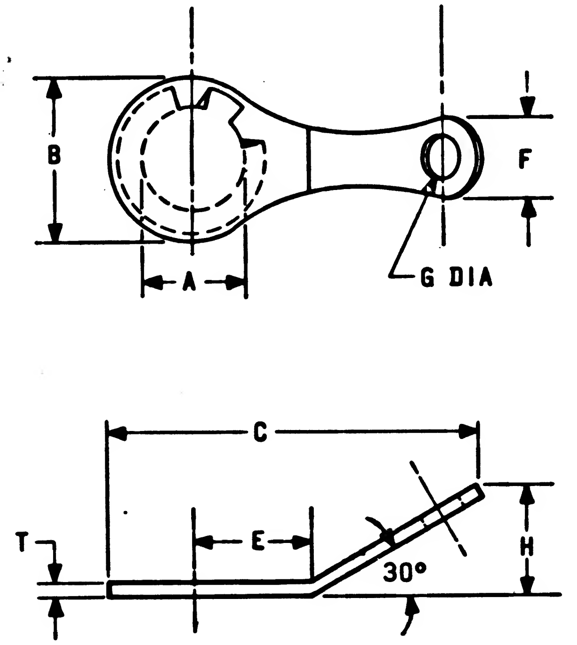
REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: PHOSPHOR BRONZE ALLOY OR BRASS PER QQ-B-226, PER TABLE 1.
     - (2) FINISH: HOT SOLDER DIP.
     - (3) DIMENSIONS: AS PER DRAWING.
     - (4) MARKING:
       - (a) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         SUPPLIER'S NAME
         NASA PART NUMBER, DASH NUMBER, AND REVISION LETTER
       MANUFACTURER'S PART NUMBER, DATE CODE, OR DATE OF MANUFACTURE MAY APPEAR ON THE PART OR PACKAGE.



STYLE "B"



STYLE "A"

TABLE 1

NASA PART NUMBER	SIZE SCREW (REF)	"A" DIA MAX	"A" DIA MIN	B	C	E	F	G DIA	H	T THICKNESS	STYLE	MATERIAL
-1, -2, -3	NOT	AVAILABLE										PHOSPHOR BRONZE
1010638-4	4	.123	.116	.31	.81	.27	.17	.09	.23	.018	A	"
-5	5	.136	.129	.31	.81	.27	.17	.09	.23	.018	A	"
-6	6	.150	.142	.31	.8	.27	.17	.09	.23	.018	A	"
-7	NOT	AVAILABLE									A	"
-8	8	.176	.168	.31	.81	.27	.17	.09	.23	.018	A	"
-9	NOT	AVAILABLE									A	"
-10	10	.204	.195	.34	.83	.27	.17	.09	.23	.018	A	"
-11	10	.202	.196	.31	.87	—	.17	.09	—	.018	B	BRASS
-12	2	.123	.116	.31	.81	.27	.17	.09	.23	.018	A	PHOSPHOR BRONZE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.005 ±.02 ANGLES ±.5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO
CONTRACT NAS 9-497

DRAWN D. Motley DATE 21AUG63
CHECKED Wilson 21 AUG 63
APPROVAL D. R. Test 9-5-63
APPROVAL

NASA APPROVAL 9/5/63
MIT APPROVAL 9/5/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL - LUG, SOLDER, ANGLE

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010638
SCALE NONE
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010638 E

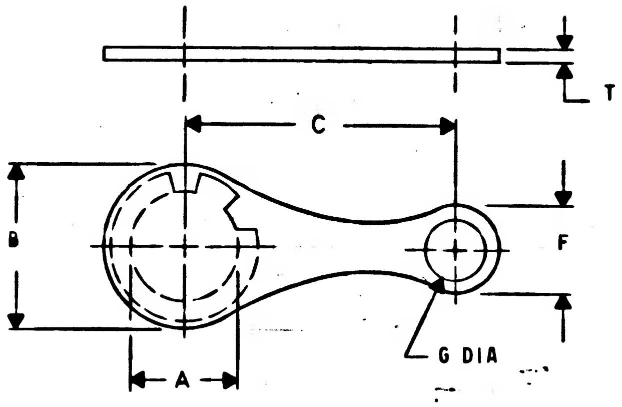
SYM	DESCRIPTION	DATE	APPROVAL
	REVISIONS 02927		
-	INITIAL RELEASE CLASS A PER TDRR 02927	5 Sep 63	WK
A	REVISED PER TDRR 04215	24 Oct 63	WK
B	REVISED PER TDRR 05324	27 Dec 63	WK
C	REVISED PER TDRR 22445	[illegible] 65	WK
D	REVISED PER TDRR 23459	11/2/65	WK
E	REVISED PER TDRR 27157	3/22/66	WK

REQUIREMENTS:

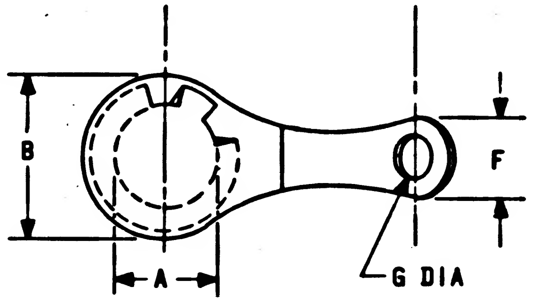
1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

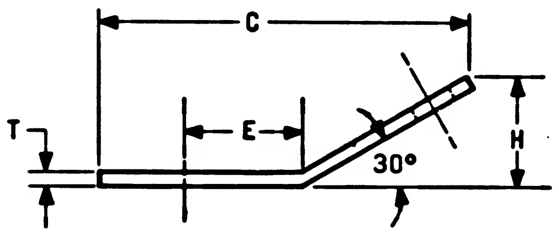
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: PHOSPHOR BRONZE ALLOY OR BRASS PER QQ-B-226, PER TABLE 1.
     - (2) FINISH: HOT SOLDER DIP.
     - (3) DIMENSIONS: AS PER DRAWING.
     - (4) MARKING:
       - (a) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME
         - NASA PART NUMBER, DASH NUMBER, AND REVISION LETTER

         MANUFACTURER'S PART NUMBER, DATE CODE, OR DATE OF MANUFACTURE MAY APPEAR ON THE PART OR PACKAGE.



STYLE "B"





STYLE "A"

TABLE 1

NASA PART NUMBER	SIZE SCREW (REF)	"A" DIA MAX	"A" DIA MIN	B	C	E	F	G DIA	H	T THICKNESS	STYLE	MATERIAL
-1, -2, -3	NOT	AVAILABLE										PHOSPHOR BRONZE
1010638-4	4	.123	.116	.31	.81	.27	.17	.09	.23	.018	A	"
-5	5	.136	.129	.31	.81	.27	.17	.09	.23	.018	A	"
-6	6	.150	.142	.31	.81	.27	.17	.09	.23	.018	A	"
-7	NOT	AVAILABLE									A	"
-8	8	.176	.168	.31	.81	.27	.17	.09	.23	.018	A	"
-9	NOT	AVAILABLE									A	"
-10	10	.204	.195	.34	.83	.27	.17	.09	.23	.018	A	"
-11	10	.202	.196	.31	.87	—	.17	.09	—	.018	B	BRASS
-12	2	.095	.089	.31	.625	-	.17	.09	-	.018	B	PHOSPHOR BRONZE

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.005 ±.02 ANGLES ±.5°
DO NOT SCALE THIS DRAWING

MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH SEE REQUIREMENTS

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO
CONTRACT NAS 9-497

DRAWN D. Malloy DATE 21 AUG 63
CHECKED Wilson 21 AUG 63
APPROVAL D. R. Test 9-5-63
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL - LUG, SOLDER

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010638
SCALE NONE
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

— | 1010638

REVISIONS 02927			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 02927	5 Sep 63	WK

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

INSPECTION AND ACCEPTANCE:

MECHANICAL REQUIREMENTS:

MATERIAL: PHOSPHOR BRONZE ALLOY

FINISH: HOT SOLDER DIP.

DIMENSIONS: AS PER DRAWING.

MARKING:

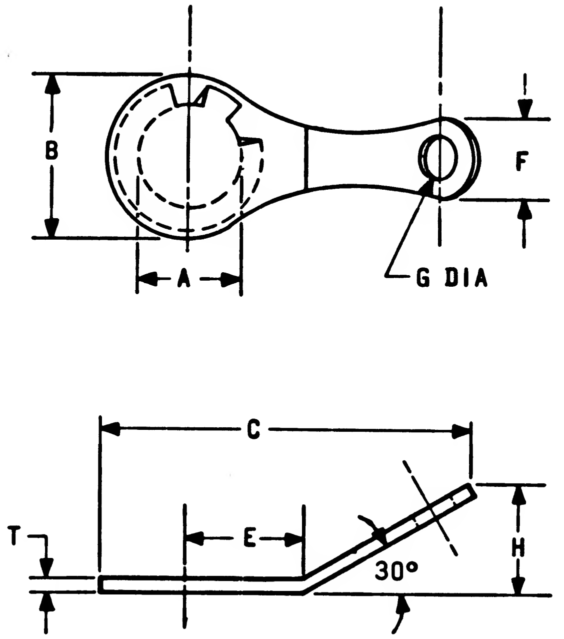
PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:

SUPPLIER'S NAME

NASA PART NUMBER, DASH NUMBER, AND REVISION LETTER

MANUFACTURER'S PART NUMBER, DATE CODE, OR DATE OF MANUFACTURE MAY APPEAR ON THE PART OR PACKAGE.

NASA PART NUMBER	SIZE SCREW (REF)	"A" DIA		B	C	E	F	G DIA	H	T THICKNESS
		MAX	MIN							
1010638-4	4	.123	.116	.31	.81	.27	.17	.09	.23	.018



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.005 ±.02 ANGLES ±.5°
DO NOT SCALE THIS DRAWING

MATERIAL: SEE REQUIREMENTS

HEAT TREATMENT: NONE

FINAL FINISH: SEE REQUIREMENTS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO
CONTRACT NAS 9-497

DRAWN D. Motley DATE 21 AUG 63
CHECKED Wilson 21 AUG 63
APPROVAL D. R. Test 9-5-63
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL - LUG, SOLDER, 30° ANGLE

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1010638
SCALE NONE | WT | SHEET 1 OF 1

1010638 —

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

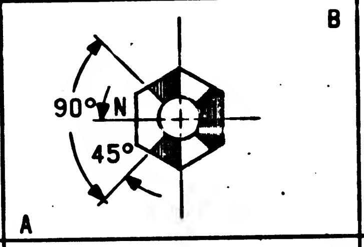
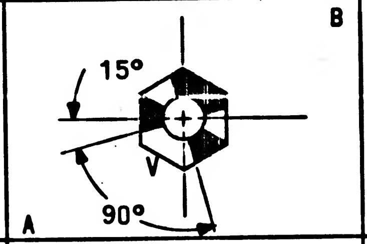
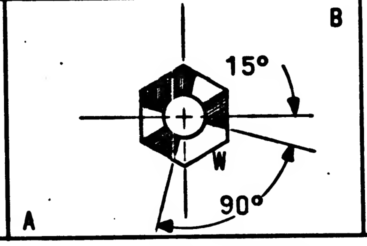
1010641 A

REVISIONS 02925

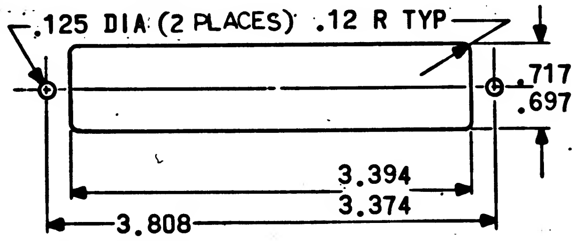
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02925	5Sep63	WK
A	REVISED PER TDRR 06528		RPK WK

A	A
—	—
SHEET 1	SHEET 2

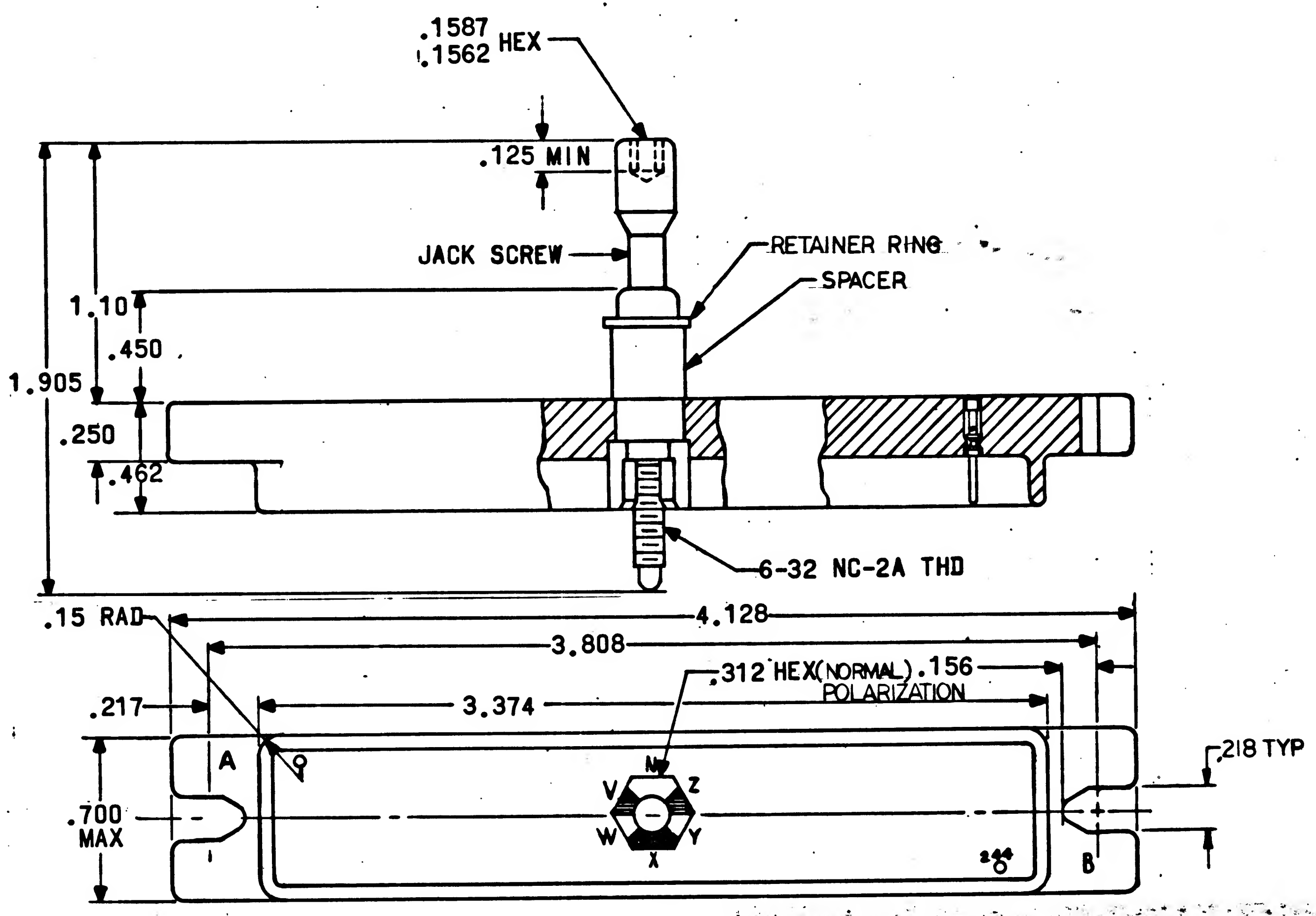
REVISION STATUS OF SHEETS

NASA PART NUMBER	POLARIZING CHART	NO. OF CONTACTS
1010641-144		244
1010641-244		244
1010641-344		244

MATES WITH 1010642



RECOMMENDED MOUNTING HOLE CUTOUT



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±
DECIMALS ±.005 ±.02
ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES

HEAT TREATMENT NONE

FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497

DRAWN Roy W. Duenel DATE AUG 63
CHECKED WILSON 19 AUG 63
APPROVAL J. Duggan 9/4/63
APPROVAL
NASA APPROVAL 5/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - PLUG ELECTRICAL

(244 NO. 22 PIN CONTACTS)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010641
SCALE NONE	WT	SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010641 A

REVISIONS 02925			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02925	5 Aug 63	WR.
A	REVISED PER TDRR 06528		WK

(A)

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002052.
   - D. CONNECTOR IS DESIGNED TO USE PIN CONTACTS PER 1010738-1.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL:
       - (a) BODY: DIALLYPHTHALATE PER MIL-M-19833, TYPE SDI-5 OR GDI-30F AS APPLICABLE. (UNPIGMENTED)
       - (b) HARDWARE:
         - POLARIZING BOSS: ALUMINUM ALLOY GRADE 7075T6, PER QQ-A-277-1
         - JACKSCREW AND METAL INSERT: CORROSION RESISTANT STEEL, CLASS 303, OR 303 SE CONDITION A OR B PER MILITARY SPECIFICATION QQ-S-763.
         - SPACER: BRASS COMPOSITION 11 PER MILITARY SPECIFICATION QQ-B-626.
         - RETAINING RING: MS-16632-28 PER MILITARY SPECIFICATION MIL-R-21248.
     - (2) FINISH:
       - HARDWARE:
         - POLARIZING BOSS: GRAY ANODIZE PER SPECIFICATION MIL-A-8625, CLASS 1.
         - JACKSCREW AND METAL INSERT: PASSIVATE PER MIL-F-14072 FINISH NO. E-300. JACKSCREW IS LUBRICATED PER SPECIFICATION MIL-L-25504.
         - SPACER: NICKEL PLATE PER QQ-N-290.
     - (3) FOR POLARIZATION SEE TABLE I
       DIMENSIONS: AS PER DRAWING
     - (4) MARKING:
       PIECEMARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH ND1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, AND DATE CODE OR DATE OF MANUFACTURE. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART.
     - (5) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
       - SUPPLIER'S NAME
       - NASA PART NUMBER AND REVISION LETTER
       - SUPPLIER'S LOT OR SERIAL NUMBER
       - DATE CODE, OR DATE OF MANUFACTURE
     - (6) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL REQUIREMENTS WITH CONTACTS INSTALLED
     - (1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 160°F MEASURED BETWEEN ANY TWO ADJACENT CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY ADJACENT CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202 METHOD 302, CONDITION C.
     - (2) DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 600 VRMS. 90,000 TO 130,000 FT. - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 100 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301.
     - (3) VOLTAGE RATINGS:

	VOLTS DC	VOLTS AC RMS
SEA LEVEL	490	350
10,000 FT.	390	280
60,000 FT.	140	100

WITHSTANDING VOLTAGE (SEA LEVEL) 1500 VOLTS RMS 60 CPS WITHOUT FLASHOVER.

   - B. MECHANICAL
     - (1) CONTACT RETENTION FORCE
       WHEN CONTACTS ARE PROPERLY INSTALLED IN THEIR USING CONNECTOR, THEY ARE CAPABLE OF WITHSTANDING (WITHOUT DAMAGE) A MIN OF 15 LBS. AXIAL LOAD APPLIED IN EITHER DIRECTION AT A RATE OF 1 POUND PER SECOND.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.005 ±.02 ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN Roy H. Hinman DATE 1 AUG 63
CHECKED WILSON 19 AUG 63
APPROVAL 9/4/63
APPROVAL
NASA APPROVAL 5/5/63
MIT APPROVAL 5 Aug 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - PLUG ELECTRICAL
(244 NO. 22 PIN CONTACTS
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010641
SCALE NONE
WT
SHEET 2 OF 2

MASTER

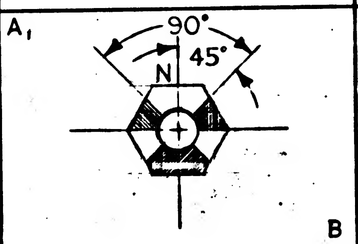
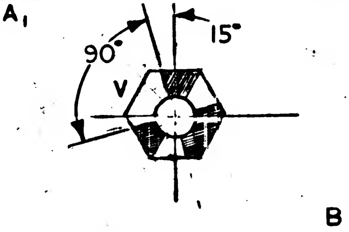
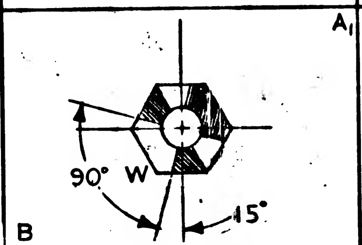
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

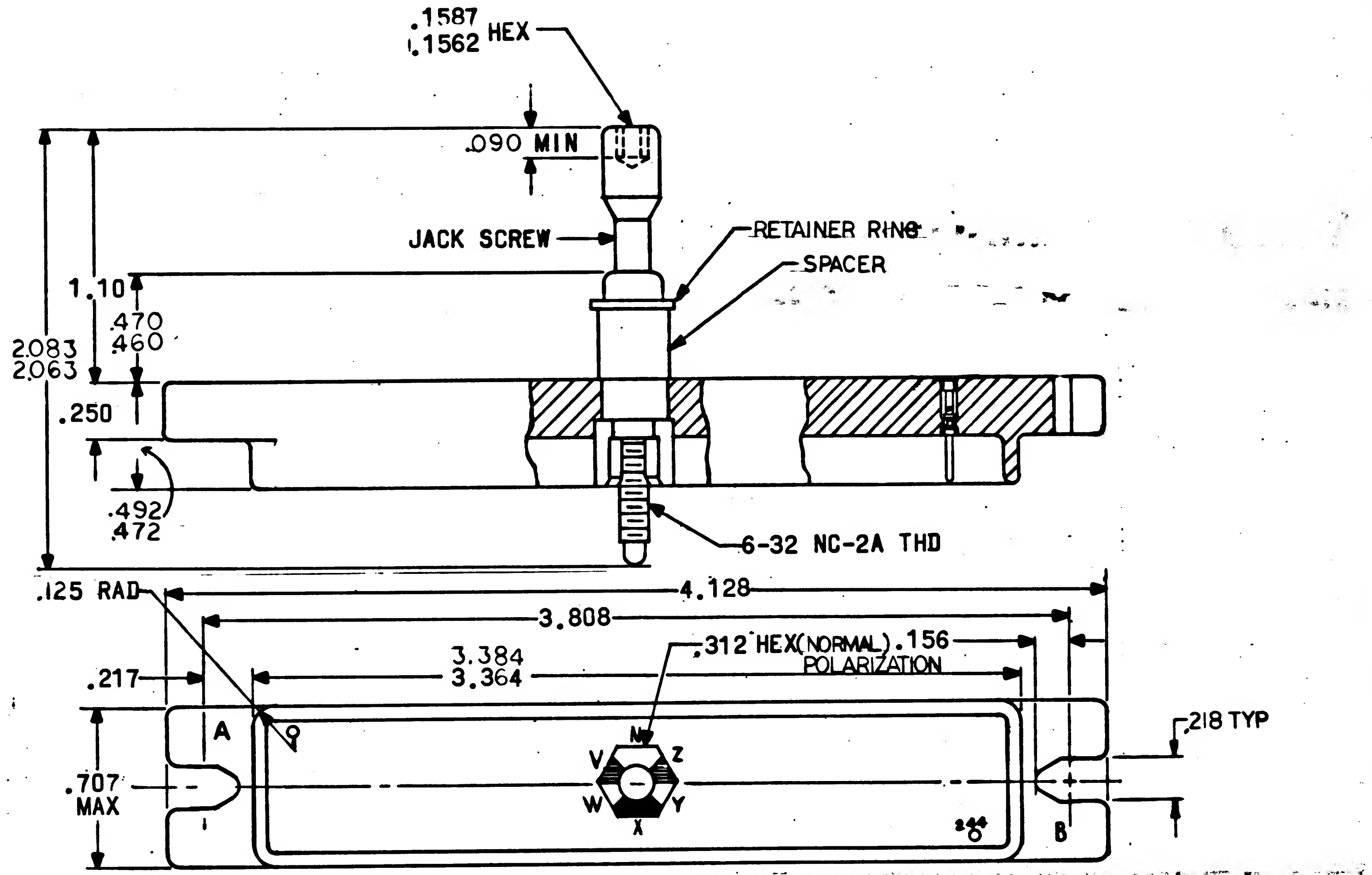
B 1010641

REVISIONS 02925

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02925	5 Sep 63	WK
A	REVISED PER TDRR 06528		EPK WK
B	REVISED PER TDRR 11943	9/1/64	WK.

NASA PART NUMBER	POLARIZING CHART	NO. OF CONTACTS
1010641-144		244
1010641-244		244
1010641-344		244

MATES WITH 1010642



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT NAS 9-497
DRAWN Roy W. Duvall DATE 14 AUG 63
CHECKED WILSON 19 AUG 63
APPROVAL E J Duggan 9/4/63
APPROVAL
NASA APPROVAL 5/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - PLUG ELECTRICAL

(244 NO. 22 PIN CONTACTS)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1010641
SCALE NONE | WT | SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

B 1010641

REVISIONS 02925			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02925	6 Aug 63	WR.
A	REVISED PER TDRR 06528		WK
B	REVISED PER TDRR 11943	9/1/64	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002052.
   - D. CONNECTOR IS DESIGNED TO USE PIN CONTACTS PER 1010738-1.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL:
       - (a) BODY: DIALLYPHTHALATE PER MIL-P-19833, TYPE SDI-5 OR GDI-30F AS APPLICABLE. (UNPIGMENTED)
       - (b) HARDWARE:
         - POLARIZING BOSS: ALUMINUM ALLOY GRADE 7075T6, PER QQ-A-277-1
         - JACKSCREW AND METAL INSERT: CORROSION RESISTANT STEEL, CLASS 303, OR 303 SE CONDITION A OR B PER MILITARY SPECIFICATION QQ-S-763.
         - SPACER: BRASS COMPOSITION 11 PER MILITARY SPECIFICATION QQ-B-626.
         - RETAINING RING: MS-16632-28 PER MILITARY SPECIFICATION MIL-R-21248.
     - (2) FINISH:
       - HARDWARE:
         - POLARIZING BOSS: GRAY ANODIZE PER SPECIFICATION MIL-A-8625, CLASS 1.
         - JACKSCREW AND METAL INSERT: PASSIVATE PER MIL-F-14072 FINISH NO. E-300. JACKSCREW IS LUBRICATED PER SPECIFICATION MIL-L-8937
         - SPACER: NICKEL PLATE PER QQ-N-290.
     - (3) FOR POLARIZATION SEE TABLE I
       DIMENSIONS: AS PER DRAWING
     - (4) MARKING:
       - PIECEMARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH ND1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, AND DATE CODE OR DATE OF MANUFACTURE. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART.
     - (5) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
       - SUPPLIER'S NAME
       - NASA PART NUMBER AND REVISION LETTER
       - SUPPLIER'S LOT OR SERIAL NUMBER
       - DATE CODE, OR DATE OF MANUFACTURE
     - (6) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL REQUIREMENTS WITH CONTACTS INSTALLED
     - (1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 150°F MEASURED BETWEEN ANY TWO ADJACENT CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY ADJACENT CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202 METHOD 302, CONDITION C.
     - (2) DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 1500VRMS. 90,000 TO 130,000 FT. - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 100 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301.
     - (3) VOLTAGE RATINGS:

	VOLTS DC	VOLTS AC RMS
SEA LEVEL	490	350
10,000 FT.	390	280
60,000 FT.	140	100

WITHSTANDING VOLTAGE (SEA LEVEL) 1500 VOLTS RMS 60 CPS WITHOUT FLASHOVER.

   - B. MECHANICAL
     - (1) CONTACT RETENTION FORCE
       WHEN CONTACTS ARE PROPERLY INSTALLED IN THEIR USING CONNECTOR, THEY ARE CAPABLE OF WITHSTANDING (WITHOUT DAMAGE) A MIN OF 15 LBS. AXIAL LOAD APPLIED IN EITHER DIRECTION AT A RATE OF 1 POUND PER SECOND.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB CAMBRIDGE, MASS.
DWG. NO. CONTRACT NAS 9-497
DRAWN Roy W. Turner DATE 14 AUG 63
CHECKED WILSON 19 AUG 63
APPROVAL J. Duggan 9/4/63
APPROVAL
NASA APPROVAL 5/5/64
MIT APPROVAL 5/4/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - PLUG ELECTRICAL
(244 NO. 22 PIN CONTACTS
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010641
SCALE NONE	WT	SHEET 2 OF 2

MASTER

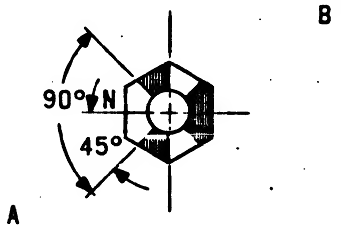
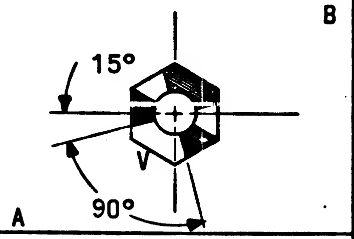
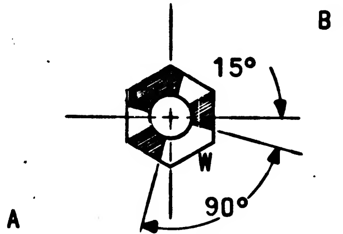
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

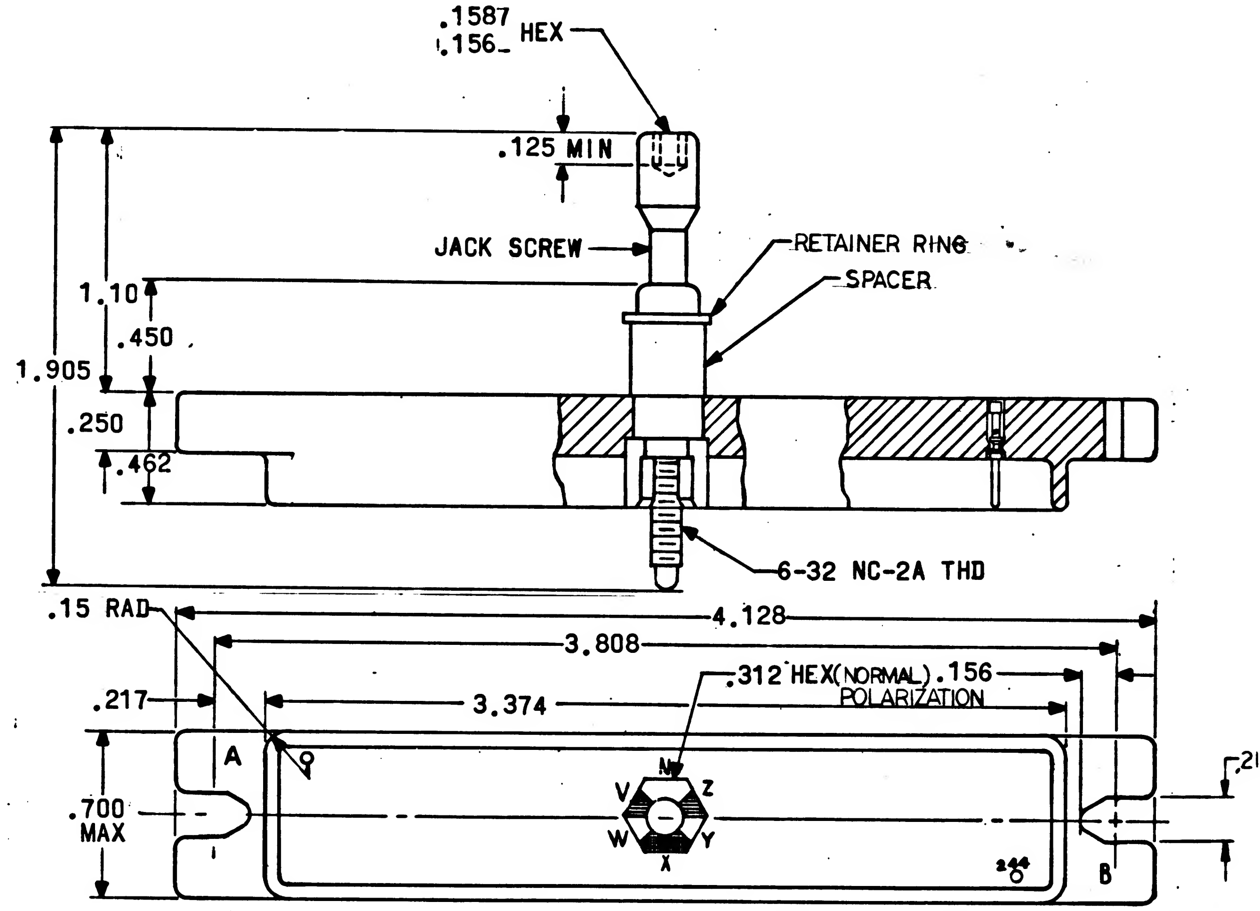
— 1010641

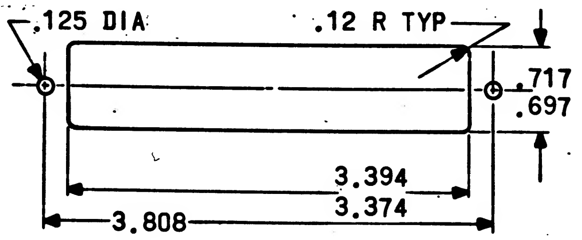
REVISIONS 02925

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02925	5 Sep 63	WK

NASA PART NUMBER	POLARIZING CHART	NO. OF CONTACTS
1010641-144		244
1010641-244		244
1010641-344		244

MATES WITH 1010642





RECOMMENDED MOUNTING HOLE CUTOUT

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497

DRAWN Roy W. Dunn DATE 14 AUG 63
CHECKED WILSON 19 AUG 63
APPROVAL E J Duggan 9/4/63
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - PLUG ELECTRICAL
244-CONTACTS FOR PIN CONTACTS
FOR NO. 22 PIN CONTACTS

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010641
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

–	1010641

REVISIONS 02925			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02925	6 Aug 63	WR.

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002052.

PIN CONTACTS ARE TO BE SUPPLIED WITH CONNECTOR BULK PACKAGED IN PLIOFILM BAG. A SUFFICIENT NUMBER OF CONTACTS ARE TO BE SUPPLIED TO FILL ALL CAVITIES PLUS 10% FOR SPARES. PINS SHALL BE PER 1010464-1.

INSPECTION AND ACCEPTANCE:

MECHANICAL REQUIREMENTS:

MATERIAL:

BODY: DIALLYPHTHALATE PER MIL-M-19833, TYPE SDI-5 OR GDI-30F AS APPLICABLE. (UNPIGMENTED)

HARDWARE:

POLARIZING BOSS: ALUMINUM ALLOY GRADE 7075T6, PER QQ-A-277-1

JACKSCREW AND METAL INSERT: CORROSION RESISTANT STEEL, CLASS 303, OR 303 SE CONDITION A OR B PER MILITARY SPECIFICATION QQ-S-763.

SPACER: BRASS COMPOSITION 11 PER MILITARY SPECIFICATION QQ-B-626.

RETAINING RING: MS-16632-28 PER MILITARY SPECIFICATION MIL-R-21248.

FINISH:

HARDWARE:

POLARIZING BOSS: GRAY ANODIZE PER SPECIFICATION MIL-A-8625, CLASS 1.

JACKSCREW AND METAL INSERT: PASSIVATE PER MIL-F-14702 FINISH NO. E-300. JACKSCREW IS LUBRICATED PER SPECIFICATION MIL-L-25504.

SPACER: NICKEL PLATE PER QQ-N-290.

FOR POLARIZATION SEE TABLE I

DIMENSIONS: AS PER DRAWING

MARKING:

PIECEMARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-130 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, AND DATE CODE OR DATE OF MANUFACTURE. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART.

PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:

SUPPLIER'S NAME
NASA PART NUMBER AND REVISION LETTER
SUPPLIER'S LOT OR SERIAL NUMBER
DATE CODE, OR DATE OF MANUFACTURE

MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

DESIGN REQUIREMENTS:

ELECTRICAL REQUIREMENTS WITH CONTACTS INSTALLED

INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 160°F MEASURED BETWEEN ANY TWO ADJACENT CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY ADJACENT CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202 METHOD 302, CONDITION C.

DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 600 VRMS. 90,000 TO 130,000 FT. - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 100 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301.

VOLTAGE RATINGS:

	VOLTS DC	VOLTS AC RMS
SEA LEVEL	490	350
10,000 FT.	390	280
60,000 FT.	140	100

WITHSTANDING VOLTAGE (SEA LEVEL) 1500 VOLTS RMS 60 CPS WITHOUT FLASHOVER.

MECHANICAL

CONTACT RETENTION FORCE

WHEN CONTACTS ARE PROPERLY INSTALLED IN THEIR USING CONNECTOR, THEY ARE CAPABLE OF WITHSTANDING (WITHOUT DAMAGE) A MIN OF 15 LBS. AXIAL LOAD APPLIED IN EITHER DIRECTION AT A RATE OF 1 POUND PER SECOND.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.005 ±.02 ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTES
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN Roy H. Turner DATE 14 AUG 63
CHECKED WILSON 19 AUG 63
APPROVAL J. Duggan 9/4/63
APPROVAL
NASA APPROVAL 5/5/64
MIT APPROVAL W. Langford 5/4/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - PLUG ELECTRICAL
244-CONTACTS FOR PIN CONTACTS
FOR NO. 22 PIN CONTACTS

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010641
SCALE NONE
WT
SHEET 2 OF 2

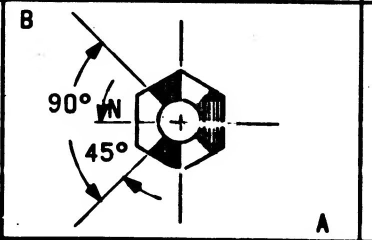
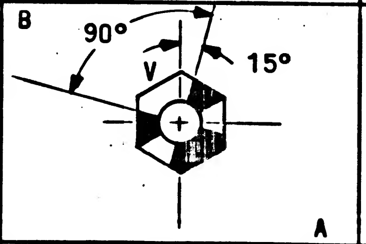
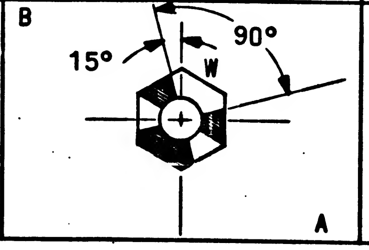
MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

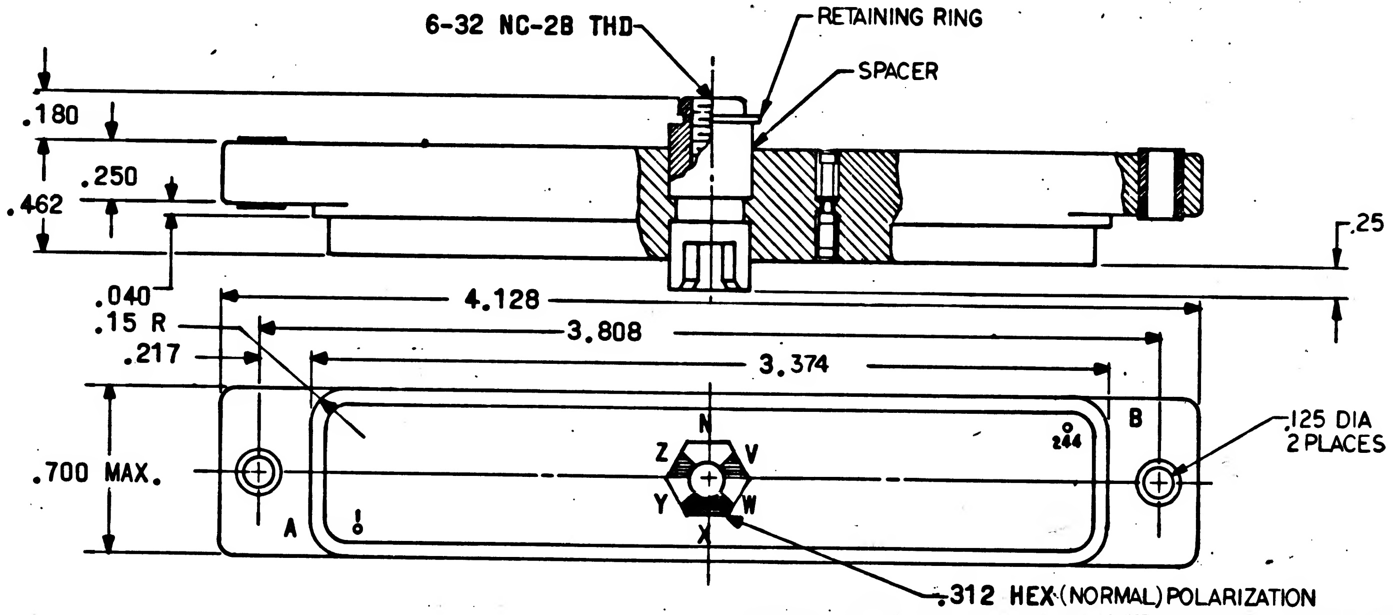
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OT 'ER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 02925

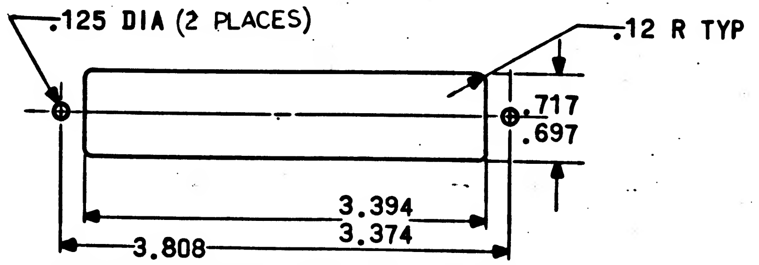
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02825	5 Sep 63	WH
A	REVISED PER TDRR 06532		RPK WR

NASA PART NUMBER	POLARIZING POSITION	NO. OF CONTACT CAVITIES
1010642-144		244
1010642-244		244
1010642-344		244

A	A
—	—
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	



APPLICATION DATA (FOR REFERENCE):
MATES WITH 1010641.



RECOMMENDED MOUNTING HOLE CUTOUT

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R.W. Turner DATE 16 Aug 63
CHECKED Wilson 20 Aug 63
~~APPROVAL~~ E. Duggan 9/12/63
APPROVAL
NASA APPROVAL [illegible] 9/5/63
MIT APPROVAL [illegible] 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - RECEPTACLE
(244 FOR NO. 22 SOCKET CONTACTS)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010642
SCALE NONE WT SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010642 | A

REVISIONS 02925

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEAE CLASS A PER TDRR 02925	5 Sep 63	WK.
A	REVISED PER TDRR 06532		RPK WK

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002052.

D. CONNECTOR IS DESIGNED TO UTILIZE SOCKET CONTACTS PER 1010738-2.

2. INSPECTION AND ACCEPTANCE:

A. MECHANICAL REQUIREMENTS:

(1) MATERIAL:

(a) BODY: DIALLYPHTHALATE PER MIL-M-19833, TYPE GDI-30F (UNPIGMENTED)

(b) HARDWARE:
POLARIZING BOSS: ALUMINUM ALLOY GRADE 7075T6 PER QQ-A-277-1

(c) METAL INSERT: CRES, CLASS 303 OR 303SE COND A OR B PER QQ-S-763.

(d) SPACER: BRASS, COMPOSITION II PER QQ-S-626

(e) RETAINING RING: MS-16632-28 PER MILITARY SPECIFICATION MIL-R-21248.

B. FINISH:

(1) HARDWARE:

(a) POLARIZING BOSS: GRAY ANODIZE PER SPECIFICATION MIL-A-8625 CLASS 1.

(b) METAL INSERT: PASSIVATE PER MIL-F-14072 FINISH NO. E-300.

(c) SPACER: NICKEL PLATE PER QQ-N-290.

C. FOR POLARIZATION SEE TABLE I
DIMENSIONS: AS PER DRAWING

D. MARKING:

(1) PIECEMARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH ND 1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, AND DATE CODE OR DATE OF MANUFACTURE. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART.

(2) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
SUPPLIER'S NAME
NASA PART NUMBER AND REVISION LETTER
SUPPLIER'S LOT OR SERIAL NUMBER
DATE CODE, OR DATE OF MANUFACTURE

(3) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

3. DESIGN REQUIREMENTS:

A. ELECTRICAL REQUIREMENTS WITH CONTACTS INSTALLED

(1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 160°F MEASURED BETWEEN ANY TWO ADJACENT CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY ADJACENT CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202 METHOD 302, CONDITION C.

(2) DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 600 VRMS. 90,000 TO 130,000 FT. - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 100 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301.

(3) VOLTAGE RATINGS:

	VOLTS DC	VOLTS AC RMS
SEA LEVEL	490	350
10,000 FT.	390	280
60,000 FT.	140	100

WITHSTANDING VOLTAGE (SEA LEVEL) 1500 VOLTS RMS 60 CPS WITHOUT FLASHOVER.

4. MECHANICAL

A. CONTACT RETENTION FORCE

(1) WHEN CONTACTS ARE PROPERLY INSTALLED IN THEIR USING CONNECTOR, THEY ARE CAPABLE OF WITHSTANDING (WITHOUT DAMAGE) A MIN OF 15 LBS. AXIAL LOAD APPLIED IN EITHER DIRECTION AT A RATE OF 1 POUND PER SECOND.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO.
CONTRACT NAS9-497
DRAWN R.W.D. DATE 16 AUG 63
CHECKED Wilson 20 Aug 63
APPROVAL
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - RECEPTACLE

(244 NO. 22 SOCKET CONTACTS)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010642
SCALE NONE
WT
SHEET 2 OF 2

MASTER

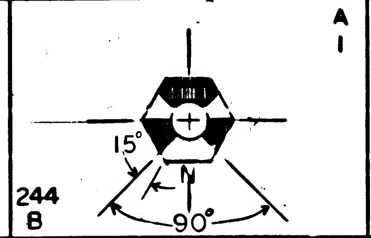
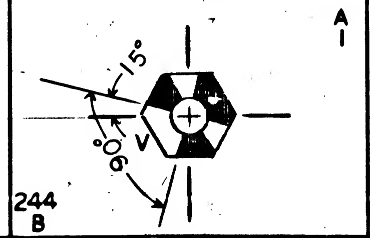
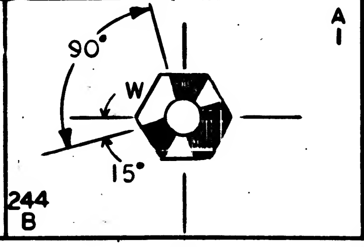
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

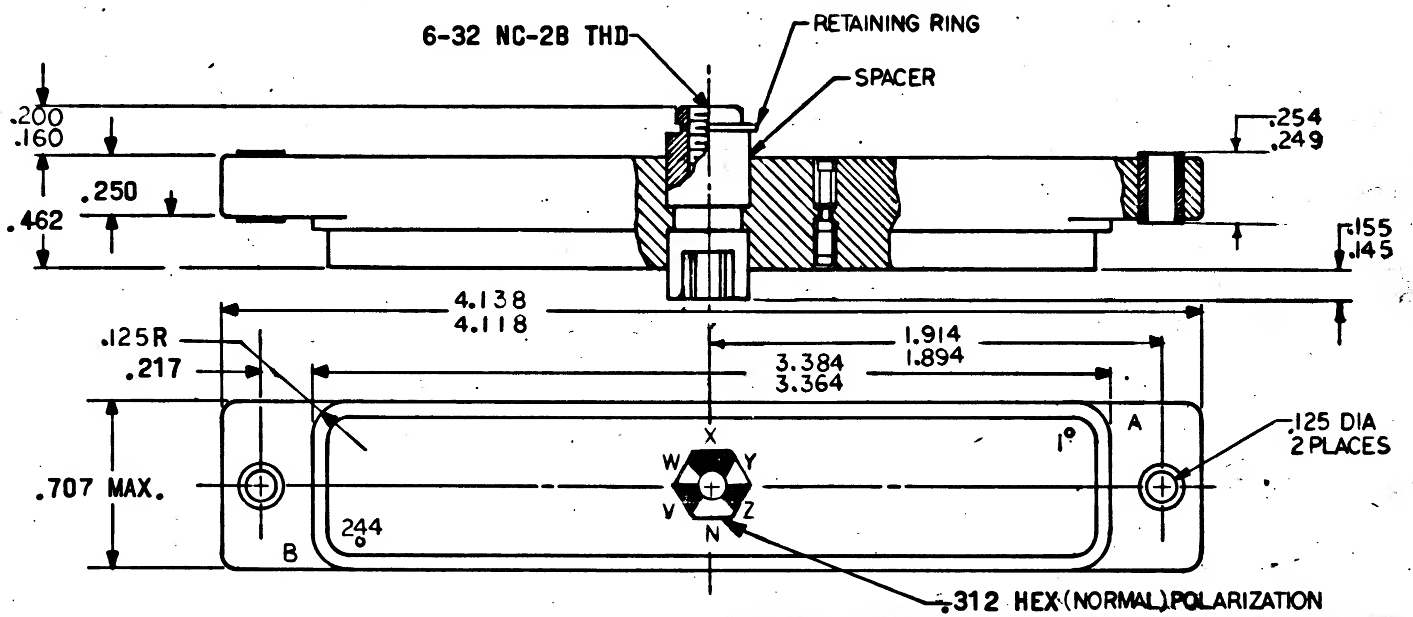
1010642 B

REVISIONS 02925

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02925	5 Sep 63	WK.
A	REVISED PER TDRR 06532		RPK WK
B	REVISED PER TDRR 11944	9/1/64	WK.

NASA PART NUMBER	POLARIZING POSITION	NO. OF CONTACT CAVITIES
1010642-144		244
1010642-244		244
1010642-344		244

APPLICATION DATA (FOR REFERENCE):
MATES WITH 1010641.



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R.W. Turner DATE 16 AUG 63
CHECKED Wilson 20 Aug 63
~~APPROVAL~~ E. Duggan 9/12/63
APPROVAL
NASA APPROVAL 5/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - RECEPTACLE

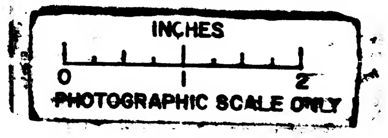
(244 NO. 22 SOCKET CONTACTS)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010642
SCALE NONE
WT
SHEET 1 OF 2

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER



NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER. AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010642 | B

REVISIONS 02925			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEAE CLASS A PER TDRR 02925	5 Sep 63	W.R.
A	REVISED PER TDRR 06532		RPK WR
B	REVISED PER TDRR 11944	6/1/64	WR

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002052.
   - D. CONNECTOR IS DESIGNED TO UTILIZE SOCKET CONTACTS PER 1010738-2.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL:
       - (a) BODY: DIALLYPHTHALATE PER MIL-P-19833, TYPE GDI-30F (UNPIGMENTED)
       - (b) HARDWARE:
         POLARIZING BOSS: ALUMINUM ALLOY GRADE 7075T6 PER QQ-A-277-1
       - (c) METAL INSERT: CRES, CLASS 303 OR 303SE COND A OR B PER QQ-S-763.
       - (d) SPACER: BRASS, COMPOSITION II PER QQ-S-626
       - (e) RETAINING RING: MS-16632-28 PER MILITARY SPECIFICATION MIL-R-21248.
   - B. FINISH:
     - (1) HARDWARE:
       - (a) POLARIZING BOSS: GRAY ANODIZE PER SPECIFICATION MIL-A-8625 CLASS 1.
       - (b) METAL INSERT: PASSIVATE PER MIL-F-14072 FINISH NO. E-300.
       - (c) SPACER: NICKEL PLATE PER QQ-N-290.
   - C. FOR POLARIZATION SEE TABLE I
     DIMENSIONS: AS PER DRAWING
   - D. MARKING:
     - (1) PIECEMARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH ND 1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, AND DATE CODE OR DATE OF MANUFACTURE. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART.
     - (2) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
       - SUPPLIER'S NAME
       - NASA PART NUMBER AND REVISION LETTER
       - SUPPLIER'S LOT OR SERIAL NUMBER
       - DATE CODE, OR DATE OF MANUFACTURE
     - (3) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL REQUIREMENTS WITH CONTACTS INSTALLED
     - (1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 150°F MEASURED BETWEEN ANY TWO ADJACENT CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY ADJACENT CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202 METHOD 302, CONDITION C.
     - (2) DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 1500 VRMS. 90,000 TO 130,000 FT. - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 100 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301.
     - (3) VOLTAGE RATINGS:

	VOLTS DC	VOLTS AC RMS
SEA LEVEL	490	350
10,000 FT.	390	280
60,000 FT.	140	100

WITHSTANDING VOLTAGE (SEA LEVEL) 1500 VOLTS RMS 60 CPS WITHOUT FLASHOVER.

4. MECHANICAL
   - A. CONTACT RETENTION FORCE
     - (1) WHEN CONTACTS ARE PROPERLY INSTALLED IN THEIR USING CONNECTOR, THEY ARE CAPABLE OF WITHSTANDING (WITHOUT DAMAGE) A MIN OF 15 LBS. AXIAL LOAD APPLIED IN EITHER DIRECTION AT A RATE OF 1 POUND PER SECOND.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ± DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. DWG. NO. CONTRACT NAS9-497
APPLICATION		MATERIAL SEE NOTES	DRAWN R.W. Turner DATE CHECKED Wilson 20 Aug 63 APPROVAL APPROVAL
		HEAT TREATMENT NONE	NASA APPROVAL 9/5/63
		FINAL FINISH NONE	MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - RECEPTACLE

(244 NO. 22 SOCKET CONTACTS)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010642
SCALE NONE	WT	SHEET 2 OF 2

MASTER

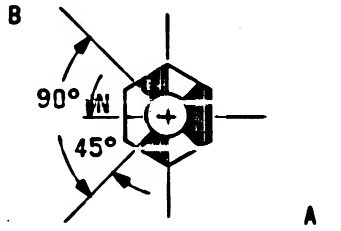
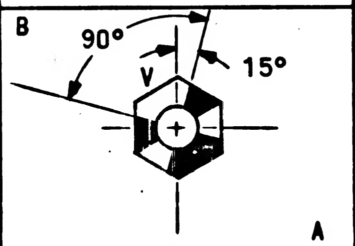
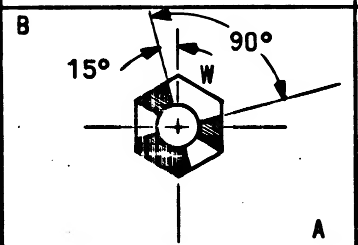
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

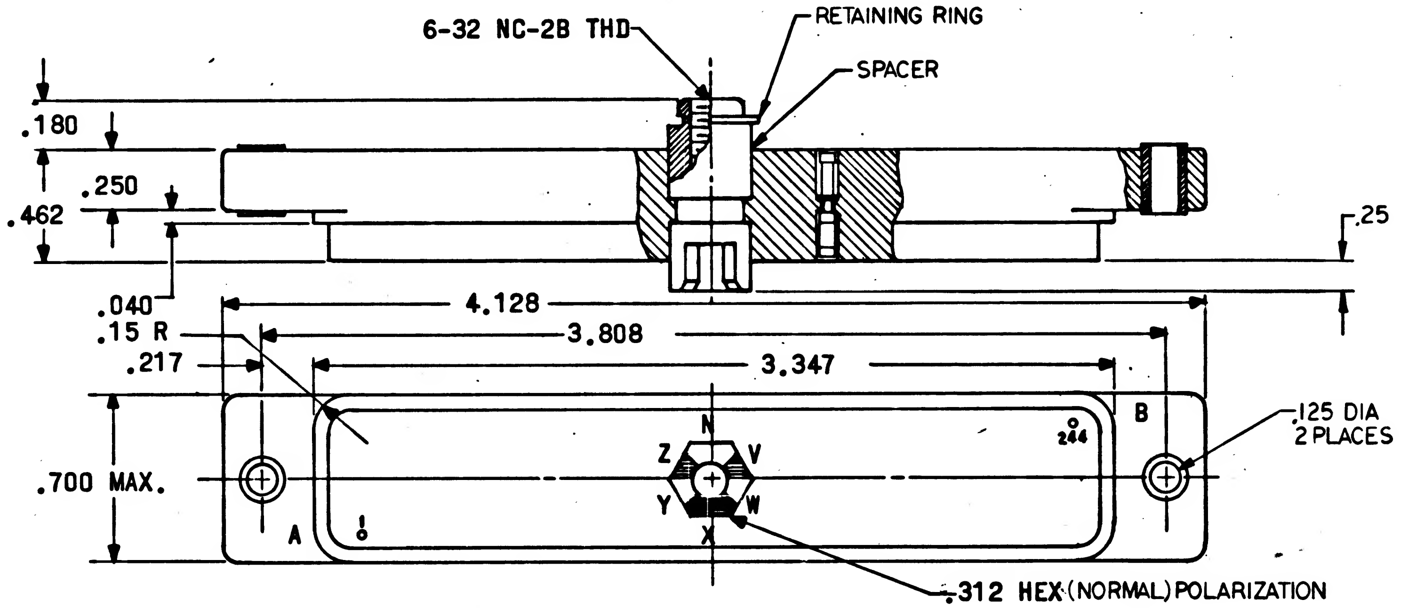
– 1010642

REVISIONS 02825

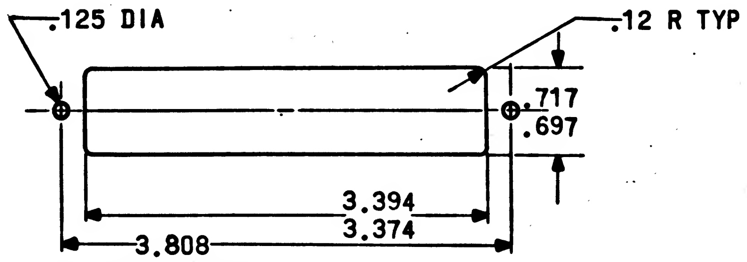
SYM	DESCRIPTION	DATE	APPROVAL
–	INITIAL RELEASE CLASS A PER TDRR 02825	5 Sep 63	WH

NASA PART NUMBER	POLARIZING POSITION	NO. OF CONTACT CAVITIES
1010642-144		244
1010642-244		244
1010642-344		244

—	—
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	



APPLICATION DATA (FOR REFERENCE):
MATES WITH 1010641.



RECOMMENDED MOUNTING HOLE CUTOUT

PROCURE ONLY FROM APPROVED SOURCES LISTED ON
ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES

HEAT TREATMENT NONE

FINAL FINISH NONE

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO CONTRACT

DRAWN R.W. Turner DATE 16 AUG 63
CHECKED Wilson 20 Aug 63
~~APPROVAL~~ E. Duggan 9/4/63
APPROVAL
NASA APPROVAL 5/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - RECEPTACLE
ELECTRICAL-244 CONTACTS
(FOR NO. 22 SOCKET CONTACTS)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010642
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

—	1010642

REVISIONS 02925			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEAE CLASS A PER TDRR 02925	5 Sep 63	W.K.

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002052.

SOCKET CONTACTS ARE TO BE SUPPLIED WITH CONNECTOR, PER 1010464-2, BULK PACKAGED IN PLIOFILM BAG. A SUFFICIENT NUMBER OF CONTACTS ARE TO BE SUPPLIED TO FILL ALL CAVITIES PLUS 10% FOR SPARES.

INSPECTION AND ACCEPTANCE:

MECHANICAL REQUIREMENTS:

MATERIAL:

BODY: DIALLYPHTHALATE PER MIL-M-19833, TYPE GDI-30F (UNPIGMENTED)

HARDWARE:

POLARIZING BOSS: ALUMINUM ALLOY GRADE 7075T6 PER QQ-A-277-1

METAL INSERT: CRES, CLASS 303 OR 303SE COND A OR B PER QQ-S-763.

SPACER: BRASS, COMPOSITION II PER QQ-S-626

RETAINING RING: MS-16632-28 PER MILITARY SPECIFICATION MIL-R-21248.

FINISH:

HARDWARE:

POLARIZING BOSS: GRAY ANODIZE PER SPECIFICATION MIL-A-8625 CLASS 1.

METAL INSERT: PASSIVATE PER MIL-F-14702 FINISH NO. E-300.

SPACER: NICKEL PLATE PER QQ-N-290.

FOR POLARIZATION SEE TABLE I

DIMENSIONS: AS PER DRAWING

MARKING:

PIECEMARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-130 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, AND DATE CODE OR DATE OF MANUFACTURE. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART.

PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:

SUPPLIER'S NAME
NASA PART NUMBER AND REVISION LETTER
SUPPLIER'S LOT OR SERIAL NUMBER
DATE CODE, OR DATE OF MANUFACTURE

MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

DESIGN REQUIREMENTS:

ELECTRICAL REQUIREMENTS WITH CONTACTS INSTALLED

INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 160°F MEASURED BETWEEN ANY TWO ADJACENT CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY ADJACENT CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202 METHOD 302, CONDITION C.

DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 600 VRMS. 90,000 TO 130,000 FT. - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 100 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301.

VOLTAGE RATINGS:

	VOLTS DC	VOLTS AC RMS
SEA LEVEL	490	350
10,000 FT.	390	280
60,000 FT.	140	100

WITHSTANDING VOLTAGE (SEA LEVEL) 1500 VOLTS RMS 60 CPS WITHOUT FLASHOVER.

MECHANICAL

CONTACT RETENTION FORCE

WHEN CONTACTS ARE PROPERLY INSTALLED IN THEIR USING CONNECTOR, THEY ARE CAPABLE OF WITHSTANDING (WITHOUT DAMAGE) A MIN OF 15 LBS. AXIAL LOAD APPLIED IN EITHER DIRECTION AT A RATE OF 1 POUND PER SECOND.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO.
CONTRACT NAS9-497
DRAWN R.W. Turn[illegible] DATE 16 AUG 63
CHECKED Wilson 20 Aug 63
APPROVAL [illegible]
APPROVAL
NASA APPROVAL [illegible] 9/5/63
MIT APPROVAL [illegible] 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - RECEPTACLE
ELECTRICAL-244 CONTACTS
(FOR NO. 22 SOCKET CONTACTS)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010642
SCALE NONE
WT
SHEET 2 OF 2

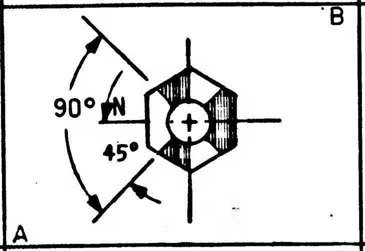
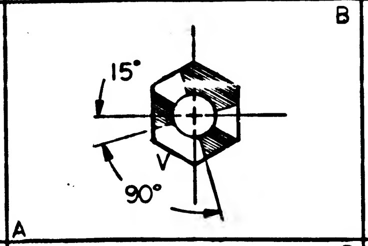
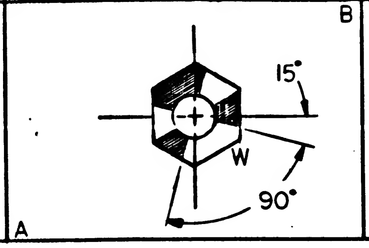
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

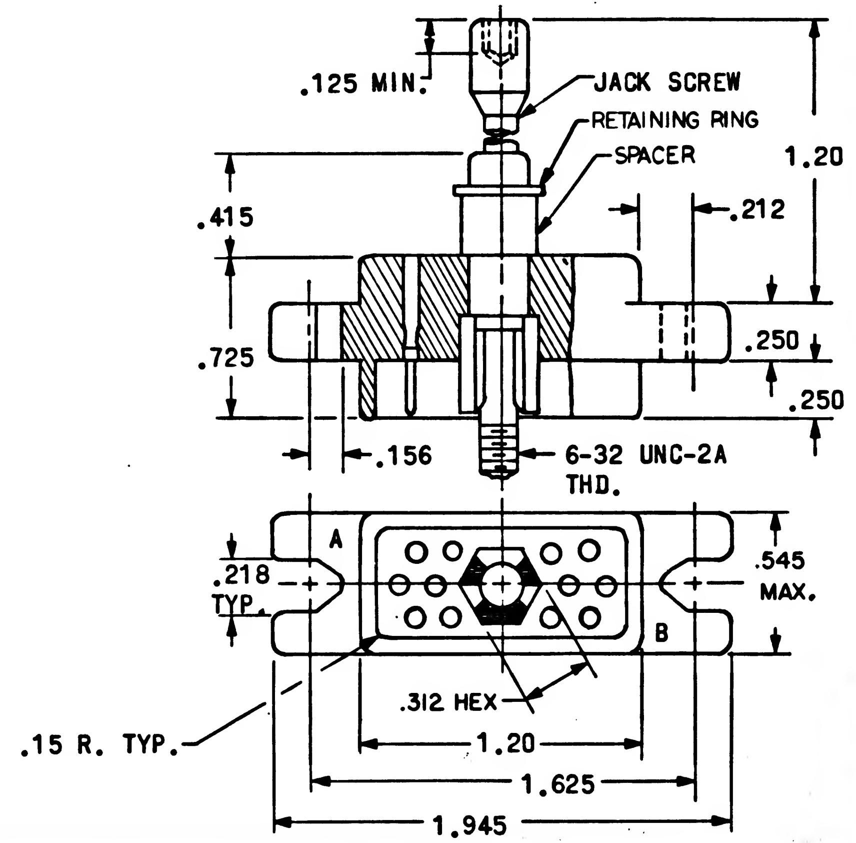
—	1010643

REVISIONS 02925

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 02925	5 Sep 63	WK

NASA PART NUMBER	POLARIZING CHART	NO. OF CONTACTS
1010643-120		12
1010643-121		12
1010643-122		12

MATES WITH 1010644



—	—
SHEET 1	SHEET 2

REVISION STATUS OF SHEETS

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS 9-497

DRAWN D. Matley DATE 16 AUG 63
CHECKED Wilson 20 Aug 63
APPROVAL by for G. MAYO 9/4/63
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - PLUG ELECTRICAL
12 CONTACTS
(FOR NO. 20 PIN CONTACTS)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010643
SCALE NONE
WT
SHEET 1 OF 2

1010643

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 02925

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02925	5 Sep 63	WK

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002052.

PIN CONTACTS ARE TO BE SUPPLIED WITH CONNECTOR BULK PACKAGED IN PLIOFILM BAG. A SUFFICIENT NUMBER OF CONTACTS ARE TO BE SUPPLIED TO FILL ALL CAVITIES PLUS 10% FOR SPARES. CONTACTS TO BE IN ACCORDANCE WITH 1010464-3.

INSPECTION AND ACCEPTANCE:

MECHANICAL REQUIREMENTS:

MATERIAL:

BODY: DIALLYPHTHALATE PER MIL-M-19833, TYPE GDI-30F (UNPIGMENTED)

HARDWARE:

POLARIZING BOSS: ALUMINUM ALLOY GRADE 7075T6 PER QQ-A-277-1

JACKSCREW AND METAL INSERT: CORROSION RESISTANT STEEL, CLASS 303, OR 303 SE CONDITION A OR B PER MILITARY SPECIFICATION QQ-S-763.

SPACER: BRASS COMPOSITION 11 PER MILITARY SPECIFICATION QQ-B-626.

RETAINING RING: MS-16632-28 PER MILITARY SPECIFICATION MIL-R-21248.

FINISH:

HARDWARE:

POLARIZING BOSS: GRAY ANODIZE PER SPECIFICATION MIL-A-8625 CLASS 1.

JACKSCREW AND METAL INSERT: PASSIVATE PER MIL-F-14702 FINISH NO. E-300. JACKSCREW IS LUBRICATED PER SPECIFICATION MIL-L-25504.

SPACER: NICKEL PLATE PER QQ-N-290.

FOR POLARIZATION SEE TABLE I

DIMENSIONS: AS PER DRAWING

MARKING:

PIECEMARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-130 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, AND DATE CODE OR DATE OF MANUFACTURE. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART.

PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:

SUPPLIER'S NAME
NASA PART NUMBER AND REVISION LETTER
SUPPLIER'S LOT OR SERIAL NUMBER
DATE CODE, OR DATE OF MANUFACTURE

MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

DESIGN REQUIREMENTS:

ELECTRICAL REQUIREMENTS WITH CONTACTS INSTALLED

INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 160°F MEASURED BETWEEN ANY TWO ADJACENT CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY ADJACENT CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202 METHOD 302, CONDITION C.

DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 600 VRMS. 90,000 TO 130,000 FT. - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 100 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301.

VOLTAGE RATINGS:

	VOLTS DC	VOLTS AC RMS
SEA LEVEL	490	350
10,000 FT.	390	280
60,000 FT.	140	100

WITHSTANDING VOLTAGE (SEA LEVEL) 1500 VOLTS RMS 60 CPS WITHOUT FLASHOVER.

MECHANICAL

CONTACT RETENTION FORCE

WHEN CONTACTS ARE PROPERLY INSTALLED IN THEIR USING CONNECTOR, THEY ARE CAPABLE OF WITHSTANDING (WITHOUT DAMAGE) A MIN OF 50 LBS. AXIAL LOAD APPLIED IN EITHER DIRECTION AT A RATE OF 1 POUND PER SECOND.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

HEAT TREATMENT

FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO
CONTRACT NAS 9-497

DRAWN D. Motley DATE 16 AUG. 63
CHECKED Wilson 20 Aug 63
APPROVAL by G. MAYO 9/4/63
APPROVAL
NASA APPROVAL W. J. Sunige 9/5/63
MIT APPROVAL WKupfer 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - PLUG ELECTRICAL
12 CONTACTS
(FOR NO. 20 PIN CONTACTS)

SPECIFICATION CONTROL DRAWING

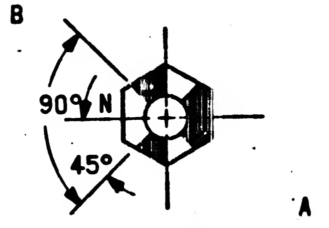
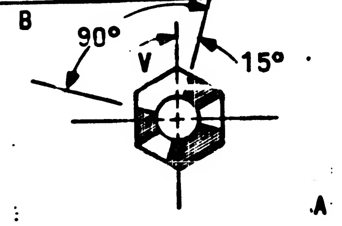
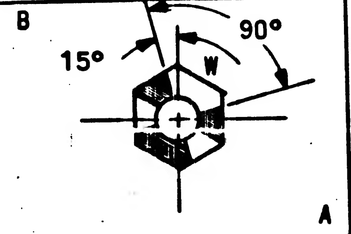
CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010643
SCALE NONE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

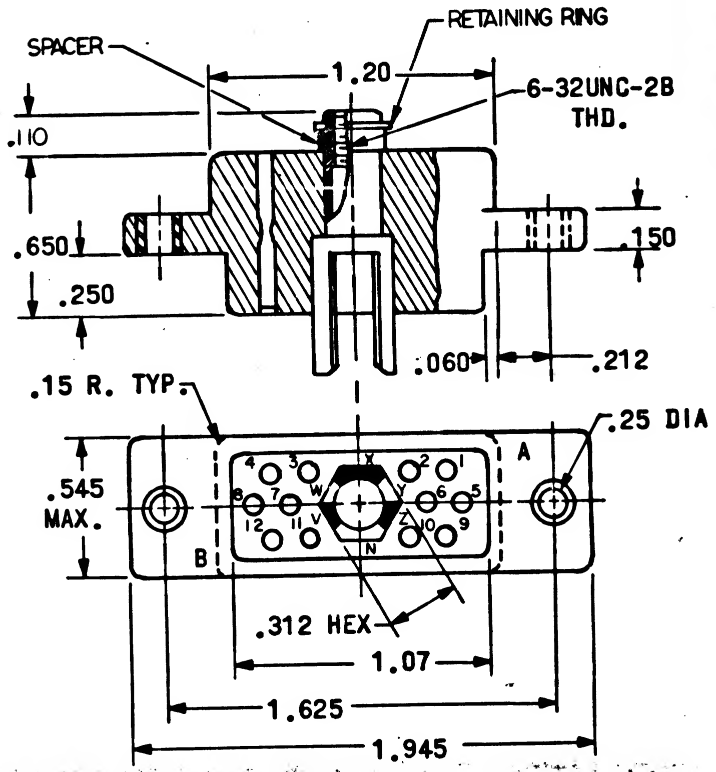
1010644 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 02925			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02925	5 Sep 63	WK
A	REVISED PER TDRR 06536		per WK

NASA PART NUMBER	POLARIZING POSITION	NO. OF CONTACTS
1010644-120		12
1010644-121		12
1010644-122		12

MATES WITH 1010643



A	A
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SHEET 1	SHEET 2

REVISION STATUS OF SHEETS

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS ±.005 ±.02
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
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DWG. NO.
CONTRACT NAS 9-947
DRAWN D. Mattey DATE 15AUG63
CHECKED Wilson 20 Aug 63
APPROVAL G. MAYO 9/4/63
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL W Kupfer 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - RECEPTACLE, ELECTRICAL
(12 NO.20 SOCKET CONTACTS)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010644
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010644 A

REVISIONS 02925			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02925	5 Sep 63	WK.
A	REVISED PER TDRR 06536		RPK WK

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002052.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL:
       - (a) BODY: DIALLYPHTHALATE PER MIL-M-19833, TYPE GDI-30F (UNPIGMENTED)
       - (b) HARDWARE:
         POLARIZING BOSS: ALUMINUM ALLOY GRADE 7075T6 PER QQ-A-277-1
       - (c) METAL INSERT: CORROSION RESISTANT STEEL, CLASS 303, OR 303 SE CONDITION A OR B PER MILITARY SPECIFICATION QQ-S-763.
       - (d) SPACER: BRASS COMPOSITION 11 PER MILITARY SPECIFICATION QQ-B-626.
       - (e) RETAINING RING: MS-16632-28 PER MILITARY SPECIFICATION MIL-R-21248.
     - (2) FINISH:
       - (a) HARDWARE:
         POLARIZING BOSS: GRAY ANODIZE PER SPECIFICATION MIL-A-8625 CLASS 1.
         METAL INSERT: PASSIVATE PER MIL-F-14072 FINISH NO. E-300.
       - (b) SPACER: NICKEL PLATE PER QQ-N-290.
     - (3) FOR POLARIZATION SEE TABLE I
     - (4) DIMENSIONS: AS PER DRAWING
     - (5) MARKING:
       PIECEMARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH ND 1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, AND DATE CODE OR DATE OF MANUFACTURE. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART.
     - (6) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
       SUPPLIER'S NAME
       NASA PART NUMBER AND REVISION LETTER
       SUPPLIER'S LOT OR SERIAL NUMBER
       DATE CODE, OR DATE OF MANUFACTURE
     - (7) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL REQUIREMENTS WITH CONTACTS INSTALLED
     - (1) INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 160°F MEASURED BETWEEN ANY TWO ADJACENT CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY ADJACENT CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202 METHOD 302, CONDITION C.
     - (2) DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 600 VRMS. 90,000 TO 130,000 FT. - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 100 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301.
     - (3) VOLTAGE RATINGS:

	VOLTS DC	VOLTS AC RMS
SEA LEVEL	490	350
10,000 FT.	390	280
60,000 FT.	140	100

WITHSTANDING VOLTAGE (SEA LEVEL) 1500 VOLTS RMS 60 CPS WITHOUT FLASHOVER.

4. MECHANICAL
   - A. CONTACT RETENTION FORCE
     - (1) WHEN CONTACTS ARE PROPERLY INSTALLED IN THEIR USING CONNECTOR, THEY ARE CAPABLE OF WITHSTANDING (WITHOUT DAMAGE) A MIN OF 50 LBS. AXIAL LOAD APPLIED IN EITHER DIRECTION AT A RATE OF 1 POUND PER SECOND.
     - (2) CONNECTOR IS DESIGNED TO UTILIZE SOCKET CONTACTS PER 1010464-4.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN D. Matley DATE 15 AUG 63
CHECKED Wilson 20 Aug 63
APPROVAL G. MAYA 9/4/63
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - RECEPTACLE, ELECTRICAL
(12 NO. 20 SOCKET CONTACTS)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010644
SCALE NONE
WT
SHEET 2 OF 2

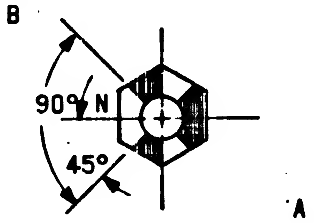
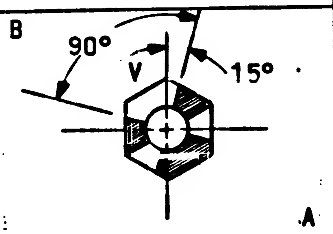
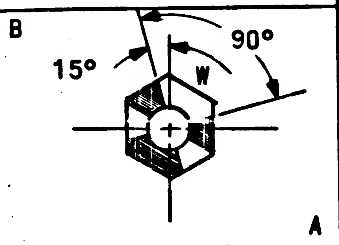
1010644 A

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

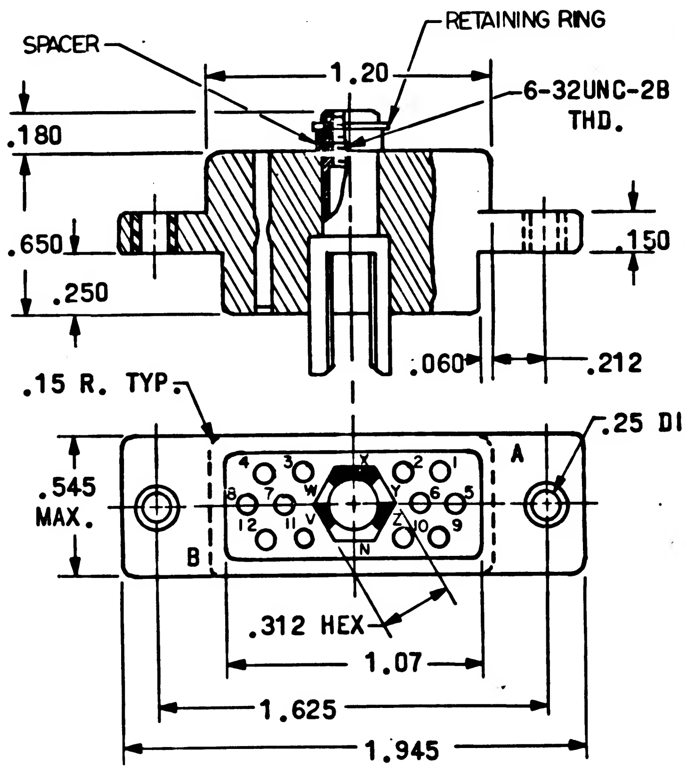
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

—	1010644

REVISIONS 02925			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02925	5 Sep 63	WK

NASA PART NUMBER	POLARIZING POSITION	NO. OF CONTACTS
1010644-120		12
1010644-121		12
1010644-122		12

MATES WITH 1010643



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

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SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS ± .005 ± .02
ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
SEE REQUIREMENTS

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INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS 9-947

DRAWN D. Motley DATE 15AUG63
CHECKED Wilson 20 Aug 63
APPROVAL G. MAYO 9/4/63
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL W Kupfer 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - RECEPTACLE, ELECTRICAL
12 CONTACTS
(FOR NO.20 SOCKET CONTACTS)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010644
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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—	1010644

REVISIONS 02925

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 02925	5 Sep 63	WK.

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002052.

SOCKET CONTACTS ARE TO BE SUPPLIED WITH CONNECTOR BULK PACKAGED IN A PLIOFILM BAG. A SUFFICIENT NUMBER OF CONTACTS ARE TO BE SUPPLIED TO FILL ALL CAVITIES PLUS 10% FOR SPARES.

INSPECTION AND ACCEPTANCE:

MECHANICAL REQUIREMENTS:

MATERIAL:

BODY: DIALLYPHTHALATE PER MIL-M-19833, TYPE GDI-30F (UNPIGMENTED)

HARDWARE:

POLARIZING BOSS: ALUMINUM ALLOY GRADE 7075T6 PER QQ-A-277-1

METAL INSERT: CORROSION RESISTANT STEEL, CLASS 303, OR 303 SE CONDITION A OR B PER MILITARY SPECIFICATION QQ-S-763.

SPACER: BRASS COMPOSITION 11 PER MILITARY SPECIFICATION QQ-B-626.

RETAINING RING: MS-16632-28 PER MILITARY SPECIFICATION MIL-R-21248.

FINISH:

HARDWARE:

POLARIZING BOSS: GRAY ANODIZE PER SPECIFICATION MIL-A-8625 CLASS 1.

METAL INSERT: PASSIVATE PER MIL-F-14702 FINISH NO. E-300.

SPACER: NICKEL PLATE PER QQ-N-290.

FOR POLARIZATION SEE TABLE I

DIMENSIONS: AS PER DRAWING

MARKING:

PIECEMARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-130 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, AND DATE CODE OR DATE OF MANUFACTURE. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART.

PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:

SUPPLIER'S NAME
NASA PART NUMBER AND REVISION LETTER
SUPPLIER'S LOT OR SERIAL NUMBER
DATE CODE, OR DATE OF MANUFACTURE

MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

DESIGN REQUIREMENTS:

ELECTRICAL REQUIREMENTS WITH CONTACTS INSTALLED

INSULATION RESISTANCE: 2000 MEGOHMS MINIMUM AT 160°F MEASURED BETWEEN ANY TWO ADJACENT CONTACTS AND BETWEEN THE SHELL OR HARDWARE AND ANY ADJACENT CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202 METHOD 302, CONDITION C.

DIELECTRIC STRENGTH: SEA LEVEL - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN TESTED AT 600 VRMS. 90,000 TO 130,000 FT. - NO EVIDENCE OF BREAKDOWN OR FLASHOVER WHEN 100 VRMS APPLIED BETWEEN ANY PAIR OF CONTACTS AND BETWEEN THE HARDWARE AND ANY CONTACT WHEN TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301.

VOLTAGE RATINGS:

	VOLTS DC	VOLTS AC RMS
SEA LEVEL	490	350
10,000 FT.	390	280
60,000 FT.	140	100

WITHSTANDING VOLTAGE (SEA LEVEL) 1500 VOLTS RMS 60 CPS WITHOUT FLASHOVER.

MECHANICAL

CONTACT RETENTION FORCE

WHEN CONTACTS ARE PROPERLY INSTALLED IN THEIR USING CONNECTOR, THEY ARE CAPABLE OF WITHSTANDING (WITHOUT DAMAGE) A MIN OF 50 LBS. AXIAL LOAD APPLIED IN EITHER DIRECTION AT A RATE OF 1 POUND PER SECOND.

CONTACTS SHALL BE IN ACCORDANCE WITH 1010464-4.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
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INSTRUMENTATION LAB
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DWG. NO
CONTRACT NAS 9-497

DRAWN D. Matley DATE 15 AUG 63
CHECKED Wilson 20 Aug 63
APPROVAL G. MAYO 9/4/63
APPROVAL
NASA APPROVAL 9/5/63
MIT APPROVAL 5 Sep 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR - RECEPTACLE, ELECTRICAL
12 CONTACTS
(FOR NO. 20 SOCKET CONTACTS)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010644
SCALE NONE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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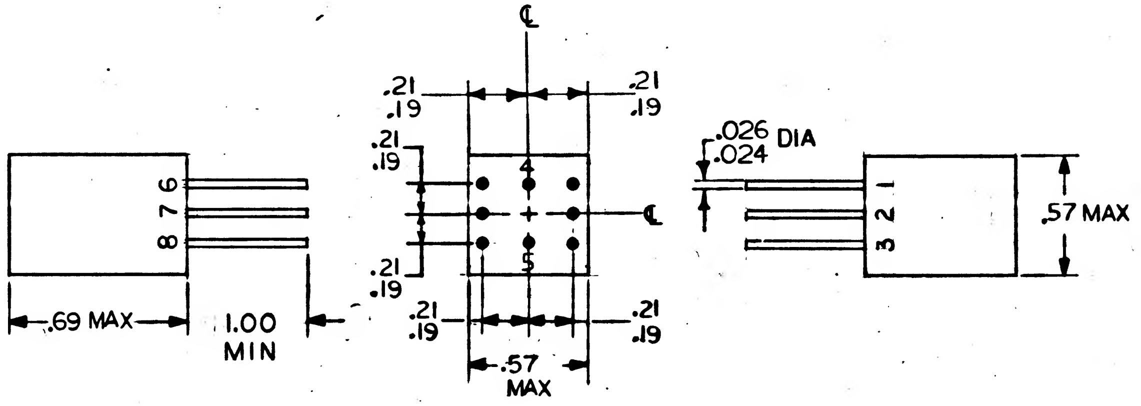
1010651 A

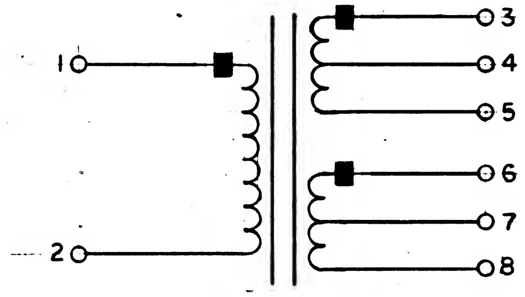
REVISIONS 04243			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 04243	10/30/63	LAL WK
A	REVISED PER TDRR 06538		WK

Ⓜ

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF MIL-T-27 WITH THE ADDITIONS AND EXCEPTIONS SPECIFIED HEREIN.
   - C. SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404, CLASS 2.
   - D. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002047.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - 1: LEAD MATERIAL SHALL BE PER ND 1015400 GOLD FLASHED. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
     - 2. MARKING-MARK PERMANENTLY AND LEGIBLY WITH THE NASA DRAWING NUMBER AND REVISION LETTER. MANUFACTURER'S SERIAL NUMBER AND TERMINAL IDENTIFICATION PER MIL-STD-130.
     - 3. DIMENSIONS: SEE FIGURE
   - B. ELECTRICAL REQUIREMENTS - UNIT SHALL MEET ALL REQUIREMENTS OF TABLE 1.
3. DESIGN:
   - A. THE UNIT SHALL MEET ALL REQUIREMENTS OF MIL-T-27, TYPE TF5RX09ZZ
   - B. WORKING VOLTAGE: 175 VOLTS.
   - C. UNIT SHALL BE LAYER WOUND
   - D. RATED LOAD: 28 VOLTS AT 800 CPS AT TERMINALS 1-2 AND R_L = 100 OHMS ACROSS BOTH TERMINALS 3-5 AND 6-8.
   - E. AMBIENT TEMPERATURE: +85°C, MAXIMUM





SCHEMATIC

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

A	A
-	-
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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DWG. NO.
CONTRACT
DRAWN Lois H. Cook DATE OCT-14-63
CHECKED G. Martz 10-21-63
APPROVAL R. J. Thiessen 10-30-63
APPROVAL
NASA APPROVAL 10/31/63
MIT APPROVAL W Kupfer 30 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER
SEXTANT RESOLVER ALIGNMENT
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010651
SCALE —
WT
SHEET 1 OF 2

INCHES
0 1 2
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A	1010651

REVISIONS 04243

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 04243	10/30/63	WK
A	REVISED PER TDRR 06538		WK

TABLE 1

INSPECTION AND ACCEPTION TESTS

SEE MIL-T-27 FOR TEST PROCEDURES
SEALING
DIELECTRIC STRENGTH: TEST VOLTAGE: 500 VOLTS
INDUCED VOLTAGE: TEST VOLTAGE: 56 VOLTS AT 1600 CPS AT TERMINALS 1-2, SECONDARY OPEN. I = 6 MA MAX.
INSULATION RESISTANCE: 10,000 MEG. MIN, AT 25°C
NO-LOAD CURRENT: TEST VOLTAGE: 28 VOLTS AT 800 CPS AT TERMINALS 1-2 I = 4 MA MAX.
OUTPUT VOLTAGE: TEST VOLTAGE: 28 VOLTS AT 800 CPS AT TERMINALS 1-2. R_L = 100 OHMS ACROSS BOTH 3-5 AND 6-8 RATIO $\frac{E(3-5)}{E(1-2)} = .0745 \pm 1\%$ RATIO $\frac{E(6-8)}{E(1-2)} = .0186 \pm 1\%$
NO LOAD POWER: TEST VOLTAGE 28V @ 800 CPS AT TERMINALS 1-2. POWER = 100 MW MAX
NO LOAD VOLTAGE RATIO WITH RL'S REMOVED
$\frac{E(3-4)}{E(4-5)} = 1.000 \pm 1\%$ $\frac{E(6-7)}{E(7-8)} = 1.000 \pm 1\%$ LOAD STABILITY WITH 28V @800 CPS APPLIED TO TERMINALS 1-2. a) WITH 100 OHMS ∠0° ACROSS TERMINALS 6-8 THE MAX CHANGE IN VOLTAGE ACROSS TERMINALS 3-5 SHALL BE ±1% AND THE MAX CHANGE IN PHASE SHIFT $1\text{-}2/_{3-5}$ SHALL BE 0.25° AS THE LOAD ACROSS TERMINALS 3-5 IS VARIED FROM 91 ∠4° TO 100 ∠0° OHMS

WITH 100 OHMS ∠0° ACROSS TERMINALS 3-5 THE MAX CHANGE IN VOLTAGE ACROSS TERMINALS 6-8 SHALL BE ±1% AND THE MAX CHANGE IN PHASE SHIFT $1\text{-}2/_{6-8}$ SHALLBE 0.25° AS THE LOAD ACROSS TERMINALS 6-8 IS VARIED FROM 97 ∠7° TO 100 ∠0° OHMS
DC RESISTANCE AT 25°C: R(1-2) = 170 OHMS MAX., R(3-5) = 2.0 OHMS MAX., R(6-8) = 2.0 OHMS MAX.
POLARITY: TERMINALS 1, 3 AND 6 SHALL BE OF LIKE POLARITY
PHASE SHIFT: WITH 28V @800 CPS ACROSS TERMINALS 1-2 AND 100 OHMS ACROSS TERMINALS 3-5 AND 6-8 SIMULTANEOUSLY THE MAX PHASE SHIFT SHALL BE. $\phi\,\frac{1-2}{3-5} = \phi\,\frac{1-2}{6-8} = 0.25°$ MAX

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

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DO NOT SCALE THIS DRAWING
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DWG. NO. CONTRACT

DRAWN Lou S. Clowk DATE OCT 10 63
CHECKED A. Marks 10-29-63
APPROVAL R. J. Russian 10-30-63
APPROVAL
NASA APPROVAL [illegible] 11/8/63
MIT APPROVAL W. Kupfer 30 Oct 63

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TRANSFORMER

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010651
SCALE —
WT
SHEET 2 OF 2

INCHES
0 1 2
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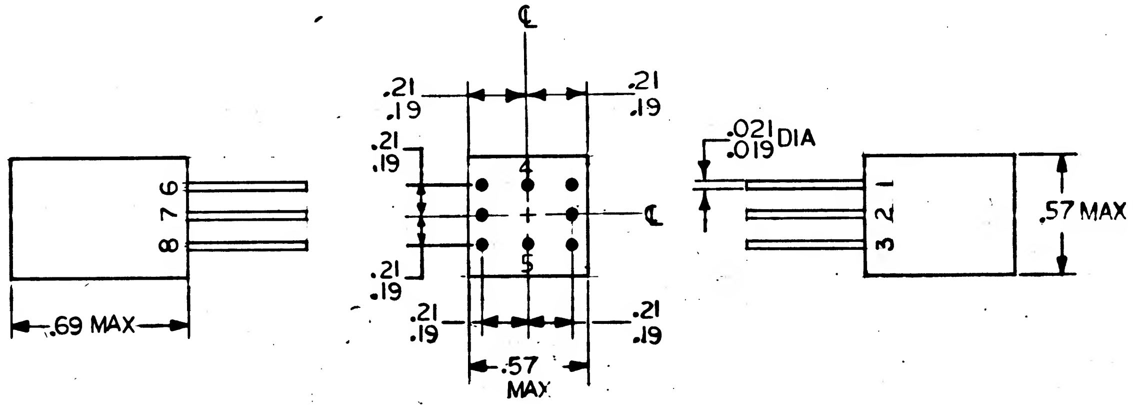
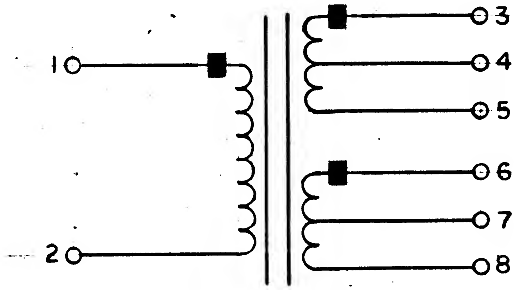
– 1010651

REVISIONS 04243			
SYM	DESCRIPTION	DATE	APPROVAL
–	INITIAL RELEASE CLASS A PER TDRR 04243	10/30/63	LAL WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF MIL-T-27 WITH THE ADDITIONS AND EXCEPTIONS SPECIFIED HEREIN.
   - C. SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404, CLASS 2.
   - D. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002087.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - 1: LEAD MATERIAL SHALL BE PER ND 1015400. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
     - 2. MARKING-MARK PERMANENTLY AND LEGIBLY WITH THE NASA DRAWING NUMBER AND REVISION LETTER. MANUFACTURER'S SERIAL NUMBER AND TERMINAL IDENTIFICATION PER MIL-STD-130.
     - 3. DIMENSIONS: SEE FIGURE
   - B. ELECTRICAL REQUIREMENTS - UNIT SHALL MEET ALL REQUIREMENTS OF TABLE 1.
3. DESIGN:
   - A. THE UNIT SHALL MEET ALL REQUIREMENTS OF MIL-T-27, TYPE TF5RX09ZZ
   - B. WORKING VOLTAGE: 175 VOLTS.
   - C. UNIT SHALL BE LAYER WOUND
   - D. RATED LOAD: 28 VOLTS AT 800 CPS AT TERMINALS 1-2 AND R_L = 100 OHMS ACROSS BOTH TERMINALS 3-5 AND 6-8.
   - E. AMBIENT TEMPERATURE: +85°C, MAXIMUM





SCHEMATIC

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

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SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

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NASA APPROVAL 11/14/63
MIT APPROVAL 30 Oct

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TRANSFORMER
SEXTANT RESOLVER ALIGNMENT
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010651
SCALE –/–
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SHEET 1 OF 2

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REVISIONS 04243

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 04243	10/30/63	WK

TABLE 1

INSPECTION AND ACCEPTION TESTS

NUMBER IN PARAGRAPH COLUMN REFER TO PARAGRAPH NUMBER IN SPECIFICATION MIL-T-27	
PARAGRAPH	
4.7.3.2.1	SEALING
4.7.5	DIELECTRIC STRENGTH: TEST VOLTAGE: 500 VOLTS
4.7.6	INDUCED VOLTAGE: TEST VOLTAGE: 56 VOLTS AT 1600 CPS AT TERMINALS 1-2, SECONDARY OPEN. I = 6 MA MAX.
4.7.7	INSULATION RESISTANCE: 10,000 MEG. MIN, AT 25°C
4.7.9.1.1 (a)	NO-LOAD CURRENT: TEST VOLTAGE: 28 VOLTS AT 800 CPS AT TERMINALS 1-2 I = 4 MA MAX.
4.7.9.2.1	OUTPUT VOLTAGE: TEST VOLTAGE: 28 VOLTS AT 800 CPS AT TERMINALS 1-2. R_L = 100 OHMS ACROSS BOTH 3-5 AND 6-8 RATIO $\frac{E(3-5)}{E(1-2)} = .0745 \pm 1\%$ RATIO $\frac{E(6-8)}{E(1-2)} = .0186 \pm 1\%$
4.7.9.1.1 (b)	NO LOAD POWER: TEST VOLTAGE 28V @ 800 CPS AT TERMINALS 1-2. POWER = 100 MW MAX
4.7.9.1.1 (d)	NO LOAD VOLTAGE RATIO WITH RL'S REMOVED
	$\frac{E(3-4)}{E(4-5)} = 1.000 \pm 1\%$ $\frac{E(6-7)}{E(7-8)} = 1.000 \pm 1\%$ LOAD STABILITY WITH 28V @800 CPS APPLIED TO TERMINALS 1-2. a) WITH 100 OHMS $\angle 0°$ ACROSS TERMINALS 6-8 THE MAX CHANGE IN VOLTAGE ACROSS TERMINALS 3-5 SHALL BE ±1% AND THE MAX CHANGE IN PHASE SHIFT $1\text{-}2/_{3\text{-}5}$ SHALL BE 0.25° AS THE LOAD ACROSS TERMINALS 3-5 IS VARIED FROM 91 $\angle 4°$ TO 100 $\angle 0°$ OHMS
4.7.9.1.1 (d) (CONT'D)	b) WITH 100 OHMS $\angle 0°$ ACROSS TERMINALS 3-5 THE MAX CHANGE IN VOLTAGE ACROSS TERMINALS 6-8 SHALL BE ±1% AND THE MAX CHANGE IN PHASE SHIFT $1\text{-}2/_{6\text{-}8}$ SHALLBE 0.25° AS THE LOAD ACROSS TERMINALS 6-8 IS VARIED FROM 97 $\angle 7°$ TO 100 $\angle 0°$ OHMS
4.7.9.3	DC RESISTANCE AT 25°C: R(1-2) = 170 OHMS MAX., R(3-5) = 2.0 OHMS MAX., R(6-8) = 2.0 OHMS MAX.
4.7.9.14	POLARITY: TERMINALS 1, 3 AND 6 SHALL BE OF LIKE POLARITY
4.7.9.18	PHASE SHIFT: WITH 28V @800 CPS ACROSS TERMINALS 1-2 AND 100 OHMS ACROSS TERMINALS 3-5 AND 6-8 SIMULTANEOUSLY THE MAX PHASE SHIFT SHALL BE. $\phi\,\frac{1-2}{3-5} = \phi\,\frac{1-2}{6-8} = 0.25°$ MAX

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LIST OF MATERIALS

NEXT ASSY	USED ON
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APPROVAL R. [illegible] 10-30-63
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NASA APPROVAL [illegible] 11/1/63
MIT APPROVAL W[illegible] 30 Oct 63

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TRANSFORMER

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010651
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1010652 A

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS 04623			
—	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	RPK WK
A	REVISED PER TDRR 23179	11/16/	wk

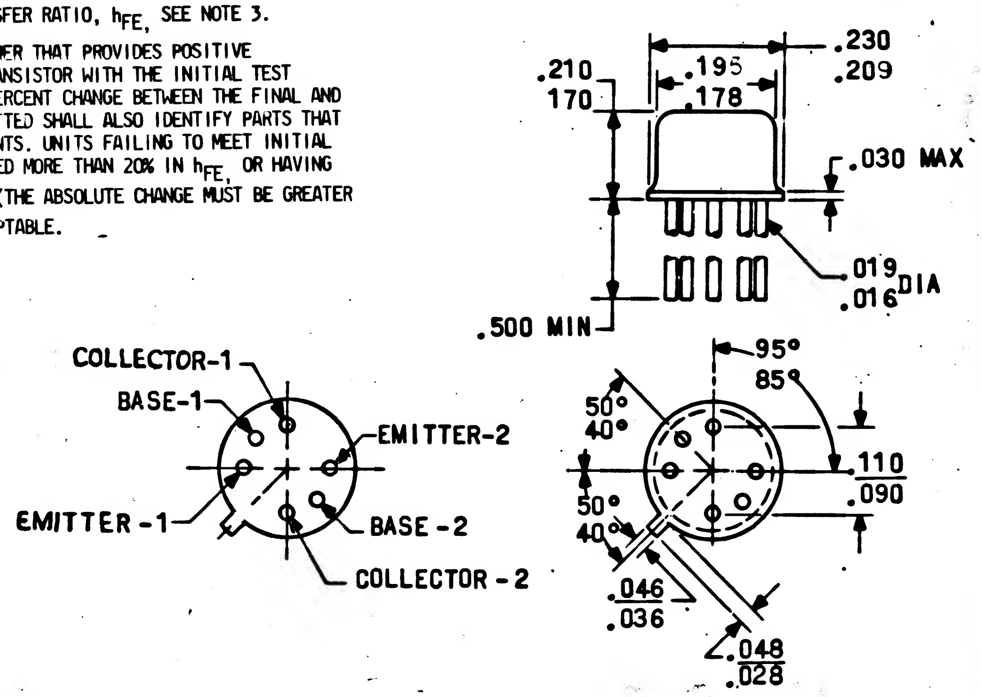
REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL THE QUALIFICATION REQUIREMENTS OF ND 1002051, UNLESS MODIFIED OR AMMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - D. PRESERVATION, PACKAGING, PACKING, AND CONTAINER MARKING PER ND1002215, CLASS 1, CODE 2.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) LEAD DATA: KOVAR WITH GOLD PLATING PER ND 1015402 A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
     - (2) MARKING: THE NASA DRAWING NUMBER (LAST THREE DIGITS REQUIRED). DASH NUMBER: AND THE MANUFACTURER'S NAME, TRADEMARK, OR CODE: DATE CODE: LOT CODE: AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND1002019. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL INCLUDE THE NASA DRAWING NUMBER, THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.
     - (3) MECHANICAL DIMENSIONS PER OUTLINE SHOWN.
   - B. ELECTRICAL REQUIREMENTS: PER TABLE II AND III, PER SECTION
     - (1) COLLECTOR CUTOFF CURRENT (I_{CBO}) AT 100°C
     - (2) EMITTER CUTOFF CURRENT (I_{EBO})
     - (3) SWITCHBACK VOLTAGE (LV_{CED})
     - (4) STATIC FORWARD CURRENT TRANSFER RATIO (h_{FE})
     - (5) STATIC FORWARD CURRENT TRANSFER RATIO, RATIO
     - (6) BASE VOLTAGE DIFFERENTIAL.
     - (7) COLLECTOR SATURATION VOLTAGE $V_{CE(SAT)}$

3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL RATING: PER TABLE I PER SECTION
   - B. ELECTRICAL CHARACTERISTICS: PER TABLES II AND III, PER SECTION
   - C. STORAGE AND OPERATING JUNCTION TEMPERATURE: -65°C TO +200°C
   - D. POWER DISSIPATION: (EACH SECTION)
     - (1) 25°C CASE TEMPERATURE: 500 MILLIWATTS
     - (2) 100°C CASE TEMPERATURE: 290 MILLIWATTS.
     - (3) 25°C AMBIENT TEMPERATURE: 250 MILLIWATTS.
   - E. POWER DISSIPATION (DUAL) TOTAL:
     - (1) 25°C CASE TEMPERATURE: 750 MILLIWATTS
     - (2) 100°C CASE TEMPERATURE: 430 MILLIWATTS
     - (3) 25°C AMBIENT TEMPERATURE: 300 MILLIWATTS.

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. ALL UNITS SHALL HAVE SUCCESSFULLY PASSED THE FOLLOWING SCREENING TESTS PERFORMED DURING THE TIME INTERVAL BETWEEN FINAL SEAL AND THE 240 HOUR BURN-IN.
     - (1) ACCELERATION AT 20,000 G MINIMUM IN THE Y_1 ORIENTATION PER MIL-STD-750, METHOD 2006, OR IMPACT SHOCK AT 28K G MINIMUM IN THE Y_1 ORIENTATION.
     - (2) HELIUM LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION C, PROCEDURE III a OR b, A LEAK RATE OF $1X10^{-8}$ ATM CC/SEC OR GREATER SHALL CONSTITUTE A FAILURE.
     - (3) GROSS LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION A. GLYCERIN MAY BE USED IN LIEU OF MINERAL OIL.
   - B. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT
     - (1) THE FOLLOWING CONDITIONS: (BOTH SECTIONS SIMULTANEOUSLY)
       - (a) AMBIENT TEMPERATURE: 25°C±5°C
       - (b) COLLECTOR VOLTAGE V_{CE}: 45 ± 5 VDC PER SECTION.
       - (c) POWER DISSIPATION: 100 MW ± 10% PER SECTION
   - C. THE MANUFACTURER SHALL DETERMINE AND RECORD THE
     - (1) FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
       - (a) EMITTER CUTOFF CURRENT, I_{EBO}.
       - (b) COLLECTOR CUTOFF CURRENT, I_{CBO}.
       - (c) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$
       - (d) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE}, SEE NOTE 3.
   - D. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN h_{FE}, OR HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} (THE ABSOLUTE CHANGE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.



SHEET 1	SHEET 2	SHEET 3	SHEET 4
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CHECKED 11 OCT 63
APPROVAL 12 NOV 63
APPROVAL
NASA APPROVAL W. J. Rhine 11-13-63
MIT APPROVAL 13 Nov 63

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NPN, SILICON, DUALSECTION
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CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010652
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SHEET 1 OF 4

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REVISIONS 04623			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	PDK WK
A	REVISED PER TDRR 23179	11/16/65	WK

TABLE II

ELECTRICAL CHARACTERISTIC AT T_C = 25°C & 1000 CPS
(UNLESS OTHERWISE SPECIFIED)

PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNITS
COLLECTOR CUTOFF CURRENT	IE = 0 VCB = 80V	ICBO	-	2	NA
COLLECTOR CUTOFF CURRENT	IE = 0 VCB = 80V TC = 150°C	ICBO	-	10	UA
EMITTER CUTOFF CURRENT	IC = 0 VEB = 5V	IEBO	-	2	NA
EMITTER TO BASE BREAKDOWN VOLTAGE	IE = 100UA IC = 0	BVEBO	7	-	VOLTS
COLLECTOR TO EMITTER BREAKDOWN VOLTAGE (SEE NOTE 4)	IC = 100MA RBE = 10Ω	BVCER	80	-	VOLTS
COLLECTOR TO BASE BREAKDOWN VOLTAGE	IC = 100UA IE = 0	BVCBO	100	-	VOLTS
SWITCHBACK VOLTAGE (SEE NOTE 4)	IC = 30MA IB = 0	LVCEO	60	-	VOLTS
STATIC FORWARD CURRENT TRANSFER RATIO, RATIO (SEE NOTE 1)	IC = 1MA VCE = 10V	$\frac{h_{FE}1}{h_{FE}2}$	.9	1	-
STATIC FORWARD CURRENT TRANSFER RATIO, RATIO (SEE NOTE 1)	IC = 100UA VCE = 10V	$\frac{h_{FE}1}{h_{FE}2}$	.9	1	-
COLLECTOR SATURATION VOLTAGE	IC = 50MA IB = 5MA	VCE(SAT)	-	1.2	VOLTS
BASE SATURATION VOLTAGE	IC = 50MA IB = 5MA	VBE(SAT)	-	.9	VOLTS
BASE VOLTAGE DIFFERENTIAL (ABSOLUTE VALUE)	IC = 1MA VCE = 5V	1 VBE 1- VBE 21	-	5	MV
BASE VOLTAGE DIFFERENTIAL (ABSOLUTE VALUE)	IC = 100UA VCE = 5V	1 VBE 1- VBE 21	-	3	MV
BASE VOLTAGE DIFFERENTIAL CHANGE	IC = 100UA VCE = 5V TA =-55°C TO+125°C	Δ (VBE 1- VBE 2)	-	10	UV/°C
SMALL - SIGNAL, SHORT - CIRCUIT INPUT IMPEDANCE	IC = 1MA VCB = 5V	hib	20	30	OHMS
OUTPUT CAPACITANCE	IE = 0 VCB = 10V f = 140KC	Cob	-	15	UUF
INPUT CAPACITANCE	IC = 0 VEB = 0.5V f = 140KC	Cib	-	85	UUF
NOISE FIGURE	IC = 300UA VCE = 10V BW = 1 CYCLE Rg = 510Ω	NF	-	8	db
SMALL-SIGNAL, SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC = 50MA VCE = 10V f = 20MC	hfe	3	-	-
COLLECTOR CUTOFF CURRENT	VCB = 80V TC = 100°C	ICBO	-	1	UA
NOISE VOLTAGE (SEE NOTE 2)	VCE = 5V IC = 100UA F = 1KC R_g = 1KΩ	-	-	.015	UV/√~

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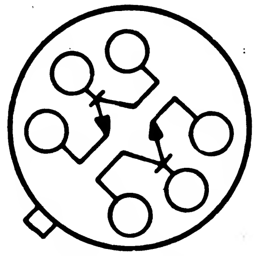

GRAPHICAL SYMBOL
ELEMENTS INSULATED FROM CASE

NOTES:

1. LOWEST VALUE OF hFE SHALL BE $h_{FE}1$ (NUMERATOR).
2. TO BE MEASURED ON QUANTECH NOISE ANALYZER MOD. 310 OR 311 OR EQUIVALENT.
3. AT LOWEST SPECIFIED COLLECTOR CURRENT
4. PULSE CONDITIONS = LENGTH ≤ 300 U SEC. DUTY CYCLE ≤ 1%

TABLE I

MAXIMUM RATINGS T_C = 25°C
(UNLESS OTHERWISE SPECIFIED)

COLLECTOR VOLTAGE (V_{CEO})	COLLECTOR VOLTAGE (V_{CBO})	EMITTER VOLTAGE (V_{EBO})	POWER DISSIPATION (EACH ELEMENT)	POWER DISSIPATION (DUAL)
VDC	VDC	VDC	WATTS	WATTS
60	100	7	.5	.75

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LIST OF MATERIALS

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SHEET 2 OF 4

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1010652 A

REVISIONS 04623

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	RPK WK
A	REVISED PER TDRR 23179	11/14/66	WK

TABLE III

ADDITIONAL ELECTRICAL CHARACTERISTIC AT TC = 25°C & 1000 CPS (UNLESS OTHERWISE SPECIFIED)

NASA PART NUMBER	MANUFACTURER'S TYPE DESIGNATION (FOR REF ONLY)	NO. OR ELEMENTS PER DEVICE	PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNIT
1010652-1	2N2980	2	SMALL-SIGNAL, SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=5V	hfe	50	150	--
			SMALL-SIGNAL, SHORT-CIRCUIT INPUT IMPEDANCE	IC=1MA VCE=5V	hie	1250	5000	OHMS
			SMALL-SIGNAL, OPEN CIRCUIT OUTPUT ADMITTANCE	IC=1MA VCE=5V	hoe	4	20	UMHO
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=10UA VCE=10V	hFE	25	75	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=100UA VCE=10V	hFE	30	90	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=10V	hFE	40	120	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=10MA VCE=10V	hFE	50	150	--
1010652-2		2	ALL REQUIREMENTS OF -1					
			SMALL-SIGNAL SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=10V	hfe	80	120	--
1010652-3		2	SMALL-SIGNAL, SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=5V	hfe	75	180	--
			SMALL-SIGNAL, SHORT-CIRCUIT INPUT IMPEDANCE	IC=1MA VCE=5V	hie	--	5000	OHMS
			SMALL-SIGNAL, OPEN CIRCUIT OUTPUT ADMITTANCE	IC=1MA VCE=5V	hoe	--	20	UMHO
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=10UA VCE=10V	hFE	40	100	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=100UA VCE=10V	hFE	60	125	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=10V	hFE	80	150	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=10MA VCE=10V	hFE	90	180	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=300UA VCE=10V	hFE	75	125	--

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DRAWN Splane DATE 10 OCT 63 CHECKED [illegible] 11 OCT 63 APPROVAL D. B. Test 12 NOV 63 APPROVAL	TRANSISTOR NPN, SILICON, DUALSECTION SPECIFICATION CONTROL DRAWING
NASA APPROVAL [illegible] 12-13-63 MIT APPROVAL [illegible] 13 Nov 63	CODE IDENT NO. 80230 SIZE C NASA DRAWING NO. 1010652 SCALE NONE WT SHEET 3 OF 4

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 04623

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	WK
A	REVISED PER TDRR 23179	11/16/65	WK

TABLE III CONTINUED

ADDITIONAL ELECTRICAL CHARACTERISTICS AT TC = 25°C & 1000 CPS (UNLESS OTHERWISE SPECIFIED)

NASA PART NUMBER	MANUFACTURER'S DESIGNATION (FOR REF ONLY)	NO. OF SECTIONS PER DEVICE	PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNIT
1010652-4		2	ALL REQUIREMENTS OF -1					
			SWITCHBACK VOLTAGE	I_C = 10 MA, I_B = 0	LV_{CEO}	80	-	VOLTS
			STATIC FORWARD CURRENT TRANSFER RATIO	V_{CE}=1.0VDC I_C= 5MA	h_{FE}	50	100	-
			COLLECTOR TO EMITTER BREAKDOWN VOLTAGE	I_C = 100MA R_{BE}= 10Ω	BV_{CER}	100	-	VOLTS
			COLLECTOR SATURATION VOLTAGE	I_C = 150 MA I_B = 15 MA	V_{CE} (SAT)	-	5	VOLTS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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DRAWN Sloane DATE 10 OCT 63
CHECKED 11 OCT 63
APPROVAL 12 NOV 63
APPROVAL
NASA APPROVAL W J 11-13-63
MIT APPROVAL 13 NOV 63

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TRANSISTOR
NPN, SILICON, DUALSECTION
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010652
SCALE 4/1
WT
SHEET 4 OF 4

1010652 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 04623			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	RPK WK
A	REVISED PER TDRR 23179	11/16/66	WK.
B	REVISED PER TDRR 30782	1 SEPT 66	JI RPS

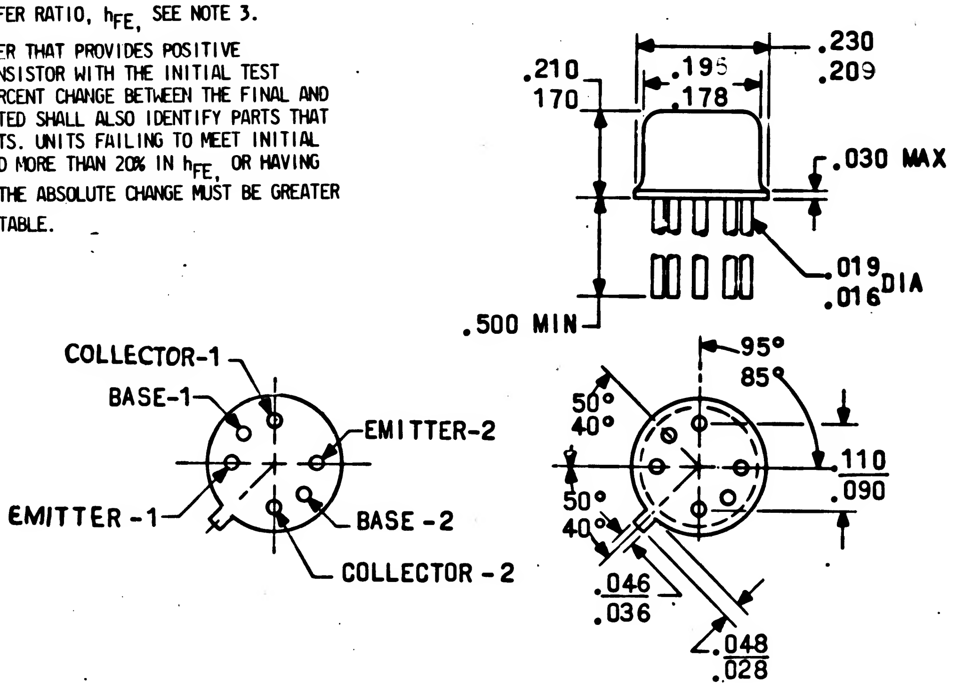
REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL THE QUALIFICATION REQUIREMENTS OF ND 1002051, UNLESS MODIFIED OR AMMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - D. PRESERVATION, PACKAGING, PACKING, AND CONTAINER MARKING PER ND1002215, CLASS 1, CODE 2.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) LEAD DATA: KOVAR WITH GOLD PLATING PER ND 1015402 A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
     - (2) MARKING: THE NASA DRAWING NUMBER (LAST THREE DIGITS REQUIRED). DASH NUMBER: AND THE MANUFACTURER'S NAME, TRADEMARK, OR CODE: DATE CODE: LOT CODE: AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND1002019. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL INCLUDE THE NASA DRAWING NUMBER, THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.
     - (3) MECHANICAL DIMENSIONS PER OUTLINE SHOWN.
   - B. ELECTRICAL REQUIREMENTS: PER TABLE II AND III, PER SECTION
     - (1) COLLECTOR CUTOFF CURRENT (I_{CBO}) AT 100°C
     - (2) EMITTER CUTOFF CURRENT (I_{EBO})
     - (3) SWITCHBACK VOLTAGE (LV_{CED})
     - (4) STATIC FORWARD CURRENT TRANSFER RATIO (h_{FE})
     - (5) STATIC FORWARD CURRENT TRANSFER RATIO, RATIO
     - (6) BASE VOLTAGE DIFFERENTIAL.
     - (7) COLLECTOR SATURATION VOLTAGE $V_{CE(SAT)}$

3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL RATING: PER TABLE I PER SECTION
   - B. ELECTRICAL CHARACTERISTICS: PER TABLES II AND III, PER SECTION
   - C. STORAGE AND OPERATING JUNCTION TEMPERATURE: -65°C TO +200°C
   - D. POWER DISSIPATION: (EACH SECTION)
     - (1) 25°C CASE TEMPERATURE: 500 MILLIWATTS
     - (2) 100°C CASE TEMPERATURE: 290 MILLIWATTS.
     - (3) 25°C AMBIENT TEMPERATURE: 250 MILLIWATTS.
   - E. POWER DISSIPATION (DUAL) TOTAL:
     - (1) 25°C CASE TEMPERATURE: 750 MILLIWATTS
     - (2) 100°C CASE TEMPERATURE: 430 MILLIWATTS
     - (3) 25°C AMBIENT TEMPERATURE: 300 MILLIWATTS.

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. ALL UNITS SHALL HAVE SUCCESSFULLY PASSED THE FOLLOWING SCREENING TESTS PERFORMED DURING THE TIME INTERVAL BETWEEN FINAL SEAL AND THE 240 HOUR BURN-IN.
     - (1) ACCELERATION AT 20,000 G MINIMUM IN THE Y_1 ORIENTATION PER MIL-STD-750, METHOD 2006, OR IMPACT SHOCK AT 28K G MINIMUM IN THE Y_1 ORIENTATION.
     - (2) HELIUM LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION C, PROCEDURE III a OR b, A LEAK RATE OF $1X10^{-8}$ ATM CC/SEC OR GREATER SHALL CONSTITUTE A FAILURE.
     - (3) GROSS LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION A. GLYCERIN MAY BE USED IN LIEU OF MINERAL OIL.
   - B. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT
     - (1) THE FOLLOWING CONDITIONS: (BOTH SECTIONS SIMULTANEOUSLY)
       - (a) AMBIENT TEMPERATURE: 25°C±5°C
       - (b) COLLECTOR VOLTAGE V_{CE}: 45 ± 5 VDC PER SECTION.
       - (c) POWER DISSIPATION: 100 MW ± 10% PER SECTION
   - C. THE MANUFACTURER SHALL DETERMINE AND RECORD THE
     - (1) FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
       - (a) EMITTER CUTOFF CURRENT, I_{EBO}.
       - (b) COLLECTOR CUTOFF CURRENT, I_{CBO}.
       - (c) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$
       - (d) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE}, SEE NOTE 3.
   - D. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN h_{FE}, OR HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} (THE ABSOLUTE CHANGE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

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CONTRACT NAS 9-497

DRAWN Sflane DATE 10 OCT 63
CHECKED 11 OCT 63
APPROVAL D. R. Test 12 NOV 63
APPROVAL
NASA APPROVAL W J Rhine 11-13-63
MIT APPROVAL 13 Nov 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR,
NPN, SILICON, DUALSECTION
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010652
SCALE 4/1
WT
SHEET 1 OF 4

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

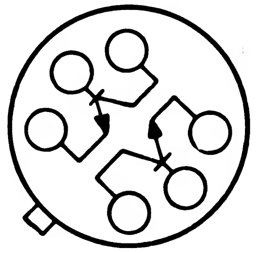
1010652 B

REVISIONS 04623			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	RDK WK
A	REVISED PER TDRR 23179	11/16/65	WK
B	REVISED PER TDRR 30782	1 SEPT 66	JI RPS

TABLE II

ELECTRICAL CHARACTERISTIC AT T_C = 25°C & 1000 CPS (UNLESS OTHERWISE SPECIFIED)

PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNITS
COLLECTOR CUTOFF CURRENT	IE = 0 VCB = 80V	ICBO	-	2	NA
COLLECTOR CUTOFF CURRENT	IE = 0 VCB = 80V TC = 150°C	ICBO	-	10	UA
EMITTER CUTOFF CURRENT	IC = 0 VEB = 5V	IEBO	-	2	NA
EMITTER TO BASE BREAKDOWN VOLTAGE	IE = 100MA IC = 0	BVEBO	7	-	VOLTS
COLLECTOR TO EMITTER BREAKDOWN VOLTAGE (SEE NOTE 4)	IC = 10MA RBE = 10Ω	BVCER	80	-	VOLTS
COLLECTOR TO BASE BREAKDOWN VOLTAGE	IC = 100UA IE = 0	BVCBO	100	-	VOLTS
SWITCHBACK VOLTAGE (SEE NOTE 4)	IC = 30MA IB = 0	LVCEO	60	-	VOLTS
STATIC FORWARD CURRENT TRANSFER RATIO, RATIO (SEE NOTE 1)	IC = 1MA VCE = 10V	$\frac{h_{FE}1}{h_{FE}2}$	.9	1	-
STATIC FORWARD CURRENT TRANSFER RATIO, RATIO (SEE NOTE 1)	IC = 100UA VCE = 10V	$\frac{h_{FE}1}{h_{FE}2}$	.9	1	-
COLLECTOR SATURATION VOLTAGE	IC = 50MA IB = 5MA	VCE(SAT)	-	1.2	VOLTS
BASE SATURATION VOLTAGE	IC = 50MA IB = 5MA	VBE(SAT)	-	.9	VOLTS
BASE VOLTAGE DIFFERENTIAL (ABSOLUTE VALUE)	IC = 1MA VCE = 5V	1 VBE 1- VBE 2 1	-	5	MV
BASE VOLTAGE DIFFERENTIAL (ABSOLUTE VALUE)	IC = 100UA VCE = 5V	1 VBE 1- VBE 2 1	-	3	MV
BASE VOLTAGE DIFFERENTIAL CHANGE	IC = 100UA VCE = 5V TA =-55°C TO+125°C	Δ (VBE 1- VBE 2)	-	10	UV/°C
SMALL - SIGNAL, SHORT - CIRCUIT INPUT IMPEDANCE	IC = 1MA VCB = 5V	hib	20	30	OHMS
OUTPUT CAPACITANCE	IE = 0 VCB = 10V f = 140KC	Cob	-	15	UUF
INPUT CAPACITANCE	IC = 0 VEB = 0.5V f = 140KC	Cib	-	85	UUF
NOISE FIGURE	IC = 300UA VCE = 10V BW = 1 CYCLE Rg = 510Ω	NF	-	8	db
SMALL-SIGNAL, SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC = 50MA VCE = 10V f = 20MC	hfe	3	-	-
COLLECTOR CUTOFF CURRENT	VCB = 80V TC = 100°C	ICBO	-	1	UA
NOISE VOLTAGE (SEE NOTE 2)	VCE = 5V IC = 100UA F = 1KC Rg = 1KΩ	-	-	.015	UV/$\sqrt{\sim}$



GRAPHICAL SYMBOL
ELEMENTS INSULATED FROM CASE

NOTES:

1. LOWEST VALUE OF hFE SHALL BE $h_{FE}1$ (NUMERATOR).
2. TO BE MEASURED ON QUANTECH NOISE ANALYZER MOD. 310 OR 311 OR EQUIVALENT.
3. AT LOWEST SPECIFIED COLLECTOR CURRENT
4. PULSE CONDITIONS = LENGTH ≤ 300 U SEC. DUTY CYCLE ≤ 1%

TABLE I

MAXIMUM RATINGS T_C = 25°C (UNLESS OTHERWISE SPECIFIED)

COLLECTOR VOLTAGE (V_{CEO})	COLLECTOR VOLTAGE (V_{CBO})	EMITTER VOLTAGE (V_{EBO})	POWER DISSIPATION (EACH ELEMENT)	POWER DISSIPATION (DUAL)
VDC	VDC	VDC	WATTS	WATTS
60	100	7	.5	.75

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

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DIMENSIONS ARE IN INCHES
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FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
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SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010652
SCALE 4/1
WT
SHEET 2 OF 4

1010652 B

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REVISIONS 04623			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	RPK WK
A	REVISED PER TDRR 23179	11/16/65	WK
B	REVISION STATUS CHANGED	1 SEPT 66	JI RPS

TABLE III

ADDITIONAL ELECTRICAL CHARACTERISTIC AT TC = 25°C & 1000 CPS (UNLESS OTHERWISE SPECIFIED)

NASA PART NUMBER	MANUFACTURER'S TYPE DESIGNATION (FOR REF ONLY)	NO. OR ELEMENTS PER DEVICE	PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNIT
1010652-1	2N2980	2	SMALL-SIGNAL, SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=5V	hfe	50	150	--
			SMALL-SIGNAL, SHORT-CIRCUIT INPUT IMPEDANCE	IC=1MA VCE=5V	hie	1250	5000	OHMS
			SMALL-SIGNAL, OPEN CIRCUIT OUTPUT ADMITTANCE	IC=1MA VCE=5V	hoe	4	20	UMHO
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=10UA VCE=10V	hFE	25	75	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=100UA VCE=10V	hFE	30	90	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=10V	hFE	40	120	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=10MA VCE=10V	hFE	50	150	--
1010652-2		2	ALL REQUIREMENTS OF -1					
			SMALL-SIGNAL SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=10V	hfe	80	120	--
1010652-3		2	SMALL-SIGNAL, SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=5V	hfe	75	180	--
			SMALL-SIGNAL, SHORT-CIRCUIT INPUT IMPEDANCE	IC=1MA VCE=5V	hie	--	5000	OHMS
			SMALL-SIGNAL, OPEN CIRCUIT OUTPUT ADMITTANCE	IC=1MA VCE=5V	hoe	--	20	UMHO
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=10UA VCE=10V	hFE	40	100	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=100UA VCE=10V	hFE	60	125	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=10V	hFE	80	150	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=10MA VCE=10V	hFE	90	180	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=300UA VCE=10V	hFE	75	125	--

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CONTRACT NAS 9-497
DRAWN Splane DATE 10 OCT 63
CHECKED Hintz 11 OCT 63
APPROVAL Test 12 NOV 63
APPROVAL
NASA APPROVAL 11-13-63
MIT APPROVAL 13 Nov 63

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TRANSISTOR
NPN, SILICON, DUALSECTION
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	1010652

SCALE NONE
WT
SHEET 3 OF 4

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 04623

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	WK
A	REVISED PER TDRR 23179	11/16/65	WK
B	REVISION STATUS CHANGED	1 SEPT 66	JI RPS

TABLE III CONTINUED

ADDITIONAL ELECTRICAL CHARACTERISTICS AT TC = 25°C & 1000 CPS (UNLESS OTHERWISE SPECIFIED)

NASA PART NUMBER	MANUFACTURER'S DESIGNATION (FOR REF ONLY)	NO. OF SECTIONS PER DEVICE	PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNIT
1010652-4		2	ALL REQUIREMENTS OF -1					
			SWITCHBACK VOLTAGE	I_C = 10 MA, I_B = 0	LV_{CEO}	80	-	VOLTS
			STATIC FORWARD CURRENT TRANSFER RATIO	V_{CE}=1.0VDC I_C= 5MA	h_{FE}	50	100	-
			COLLECTOR TO EMITTER BREAKDOWN VOLTAGE	I_C = 100MA R_{BE}= 10Ω	BV_{CER}	100	-	VOLTS
			COLLECTOR SATURATION VOLTAGE	I_C = 150 MA I_B = 15 MA	V_{CE} (SAT)	-	5	VOLTS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
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TRANSISTOR
NPN, SILICON, DUALSECTION
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CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010652
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SHEET 4 OF 4

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS 04623			
–	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	RPK WK
A	REVISED PER TDRR 23179	11/16/66	wK.
B	REVISED PER TDRR 30782	1 SEPT 66	JI RPS
C	REVISION STATUS CHANGED	3 DEC 66	AD

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.

C. UNITS SHALL BE CAPABLE OF MEETING ALL THE QUALIFICATION REQUIREMENTS OF ND 1002051, UNLESS MODIFIED OR AMMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

D. PRESERVATION, PACKAGING, PACKING, AND CONTAINER MARKING PER ND1002215, CLASS 1, CODE 2.

2. INSPECTION AND ACCEPTANCE:

A. MECHANICAL REQUIREMENTS:

(1) LEAD DATA: KOVAR WITH GOLD PLATING PER ND 1015402
A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.

(2) MARKING: THE NASA DRAWING NUMBER (LAST THREE DIGITS REQUIRED). DASH NUMBER: AND THE MANUFACTURER'S NAME, TRADEMARK, OR CODE: DATE CODE: LOT CODE: AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND1002019. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL INCLUDE THE NASA DRAWING NUMBER, THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

(3) MECHANICAL DIMENSIONS PER OUTLINE SHOWN.

B. ELECTRICAL REQUIREMENTS: PER TABLE II AND III, PER SECTION

(1) COLLECTOR CUTOFF CURRENT (I_{CBO}) AT 100°C
(2) EMITTER CUTOFF CURRENT (I_{EBO})
(3) SWITCHBACK VOLTAGE (LV_{CED})
(4) STATIC FORWARD CURRENT TRANSFER RATIO (h_{FE})
(5) STATIC FORWARD CURRENT TRANSFER RATIO, RATIO
(6) BASE VOLTAGE DIFFERENTIAL.
(7) COLLECTOR SATURATION VOLTAGE $V_{CE(SAT)}$

3. DESIGN REQUIREMENTS:

A. ELECTRICAL RATING: PER TABLE I PER SECTION
B. ELECTRICAL CHARACTERISTICS: PER TABLES II AND III, PER SECTION
C. STORAGE AND OPERATING JUNCTION TEMPERATURE: -65°C TO +200°C
D. POWER DISSIPATION: (EACH SECTION)
(1) 25°C CASE TEMPERATURE: 500 MILLIWATTS
(2) 100°C CASE TEMPERATURE: 290 MILLIWATTS.
(3) 25°C AMBIENT TEMPERATURE: 250 MILLIWATTS.
E. POWER DISSIPATION (DUAL) TOTAL:
(1) 25°C CASE TEMPERATURE: 750 MILLIWATTS
(2) 100°C CASE TEMPERATURE: 430 MILLIWATTS
(3) 25°C AMBIENT TEMPERATURE: 300 MILLIWATTS.

4. SPECIAL CONDITIONING BY SUPPLIER:

A. ALL UNITS SHALL HAVE SUCCESSFULLY PASSED THE FOLLOWING SCREENING TESTS PERFORMED DURING THE TIME INTERVAL BETWEEN FINAL SEAL AND THE 240 HOUR BURN-IN.

(1) ACCELERATION AT 20,000 G MINIMUM IN THE Y_1 ORIENTATION PER MIL-STD-750, METHOD 2006, OR IMPACT SHOCK AT 28K G MINIMUM IN THE Y_1 ORIENTATION.

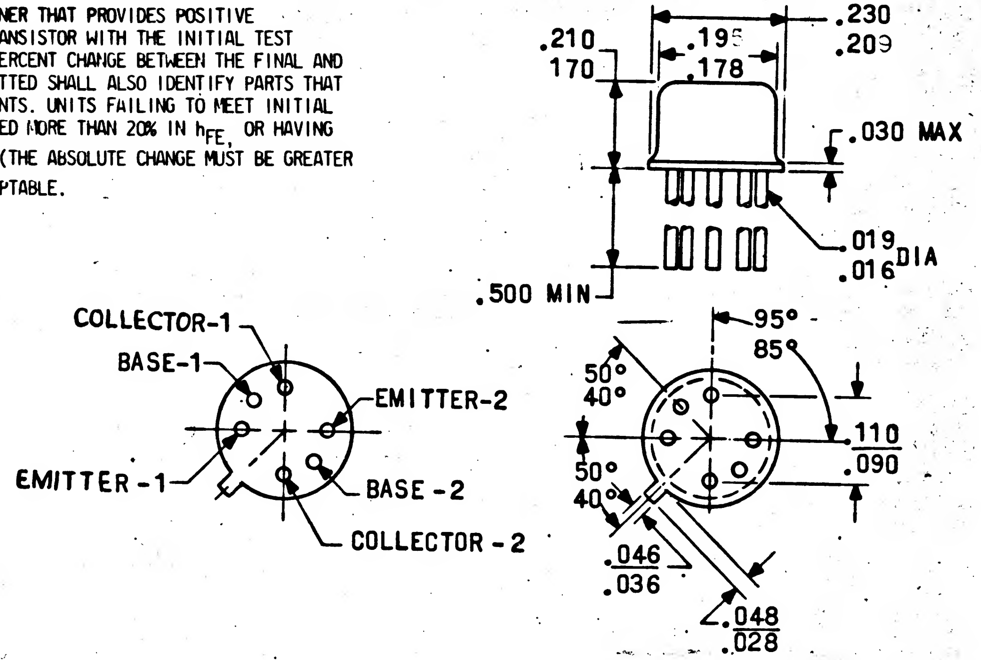
(2) HELIUM LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION C, PROCEDURE III a OR b, A LEAK RATE OF 1×10^{-8} ATM CC/SEC OR GREATER SHALL CONSTITUTE A FAILURE.

(3) GROSS LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION A. GLYCERIN MAY BE USED IN LIEU OF MINERAL OIL.

B. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT
(1) THE FOLLOWING CONDITIONS: (BOTH SECTIONS SIMULTANEOUSLY)
(a) AMBIENT TEMPERATURE: 25°C±5°C
(b) COLLECTOR VOLTAGE V_{CE}: 45 ± 5 VDC PER SECTION.
(c) POWER DISSIPATION: 100 MW ± 10% PER SECTION

C. THE MANUFACTURER SHALL DETERMINE AND RECORD THE
(1) FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
(a) EMITTER CUTOFF CURRENT, I_{EBO}.
(b) COLLECTOR CUTOFF CURRENT, I_{CBO}.
(c) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$
(d) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE}, SEE NOTE 3.

D. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN h_{FE}, OR HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} (THE ABSOLUTE CHANGE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

M I T
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CONTRACT NAS 9-497
DRAWN Splane DATE 10 OCT 63
CHECKED 11 OCT 63
APPROVAL D. R. Test 12 NOV 63
APPROVAL
NASA APPROVAL W J Rhine 11-13-63
MIT APPROVAL W Kupfer 13 Nov 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR,
NPN, SILICON, DUALSECTION
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010652
SCALE 4/1
WT
SHEET 1 OF 4

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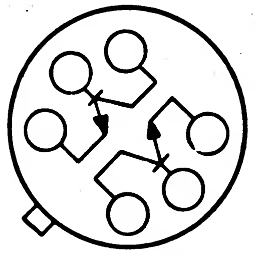
REVISIONS 04623			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	wk
A	REVISED PER TDRR 23179	11/16/65	wk
B	REVISED PER TDRR 30782	1 SEPT 66	JI RPS
C	REVISION STATUS CHANGED	3DEC66	AD

TABLE II

ELECTRICAL CHARACTERISTIC AT T_C = 25°C & 1000 CPS
(UNLESS OTHERWISE SPECIFIED)

PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS		UNITS
			MIN	MAX	
COLLECTOR CUTOFF CURRENT	IE = 0 VCB = 80V	ICBO	-	2	NA
COLLECTOR CUTOFF CURRENT	IE = 0 VCB = 80V TC = 150°C	ICBO	-	10	UA
EMITTER CUTOFF CURRENT	IC = 0 VEB = 5V	IEBO	-	2	NA
EMITTER TO BASE BREAKDOWN VOLTAGE	IE = 100MA IC = 0	BVEBO	7	-	VOLTS
COLLECTOR TO EMITTER BREAKDOWN VOLTAGE (SEE NOTE 4)	IC = 10MA RBE = 10Ω	BVCER	80	-	VOLTS
COLLECTOR TO BASE BREAKDOWN VOLTAGE	IC = 100UA IE = 0	BVCBO	100	-	VOLTS
SWITCHBACK VOLTAGE (SEE NOTE 4)	IC = 30MA IB = 0	LVCEO	60	-	VOLTS
STATIC FORWARD CURRENT TRANSFER RATIO, RATIO (SEE NOTE 1)	IC = 1MA VCE = 10V	$\frac{h_{FE}1}{h_{FE}2}$	.9	1	-
STATIC FORWARD CURRENT TRANSFER RATIO, RATIO (SEE NOTE 1)	IC = 100UA VCE = 10V	$\frac{h_{FE}1}{h_{FE}2}$	.9	1	-
COLLECTOR SATURATION VOLTAGE	IC = 50MA IB = 5MA	VCE(SAT)	-	1.2	VOLTS
BASE SATURATION VOLTAGE	IC = 50MA IB = 5MA	VBE(SAT)	-	.9	VOLTS
BASE VOLTAGE DIFFERENTIAL (ABSOLUTE VALUE)	IC = 1MA VCE = 5V	|VBE 1-VBE 2|	-	5	MV
BASE VOLTAGE DIFFERENTIAL (ABSOLUTE VALUE)	IC = 100UA VCE = 5V	|VBE 1-VBE 2|	-	3	MV
BASE VOLTAGE DIFFERENTIAL CHANGE	IC = 100UA VCE = 5V TA =-55°C TO+125°C	Δ (VBE 1-VBE 2)	-	10	UV/°C
SMALL - SIGNAL, SHORT - CIRCUIT INPUT IMPEDANCE	IC = 1MA VCB = 5V	hib	20	30	OHMS
OUTPUT CAPACITANCE	IE = 0 VCB = 10V f = 140KC	Cob	-	15	UUF
INPUT CAPACITANCE	IC = 0 VEB = 0.5V f = 140KC	Cib	-	85	UUF
NOISE FIGURE	IC = 300UA VCE = 10V BW = 1 CYCLE Rg = 510Ω	NF	-	8	db
SMALL-SIGNAL, SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC = 50MA VCE = 10V f = 20MC	hfe	3	-	-
COLLECTOR CUTOFF CURRENT	VCB = 80V TC = 100°C	ICBO	-	1	UA
NOISE VOLTAGE (SEE NOTE 2)	VCE = 5V IC = 100UA F = 1KC R_g = 1KΩ	-	-	.015	UV/√~



GRAPHICAL SYMBOL
ELEMENTS INSULATED FROM CASE

NOTES:

1. LOWEST VALUE OF hFE SHALL BE $h_{FE}1$ (NUMERATOR).
2. TO BE MEASURED ON QUANTECH NOISE ANALYZER MOD. 310 OR 311 OR EQUIVALENT.
3. AT LOWEST SPECIFIED COLLECTOR CURRENT
4. PULSE CONDITIONS = LENGTH ≦ 300 U SEC. DUTY CYCLE ≦ 1%

TABLE I

MAXIMUM RATINGS T_C = 25°C
(UNLESS OTHERWISE SPECIFIED)

COLLECTOR VOLTAGE (V_{CEO})	COLLECTOR VOLTAGE (V_{CBO})	EMITTER VOLTAGE (V_{EBO})	POWER DISSIPATION (EACH ELEMENT)	POWER DISSIPATION (DUAL)
VDC	VDC	VDC	WATTS	WATTS
60	100	7	.5	.75

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
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MATERIAL

HEAT TREATMENT

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MIT APPROVAL 13 Nov 63

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SIZE C
NASA DRAWING NO. 1010652
SCALE 4/1
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1010652 C

REVISIONS 04623			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	RPK WK
A	REVISED PER TDRR 23179	11/16/65	WK
B	REVISION STATUS CHANGED	1 SEPT 66	JI RPS
C	REVISION STATUS CHANGED	3DEC66	AD E58

TABLE III

ADDITIONAL ELECTRICAL CHARACTERISTIC AT TC = 25°C & 1000 CPS (UNLESS OTHERWISE SPECIFIED)

NASA PART NUMBER	MANUFACTURER'S TYPE DESIGNATION (FOR REF ONLY)	NO. OR ELEMENTS PER DEVICE	PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNIT
1010652-1	2N2980	2	SMALL-SIGNAL, SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=5V	hfe	50	150	--
			SMALL-SIGNAL, SHORT-CIRCUIT INPUT IMPEDANCE	IC=1MA VCE=5V	hie	1250	5000	OHMS
			SMALL-SIGNAL, OPEN CIRCUIT OUTPUT ADMITTANCE	IC=1MA VCE=5V	hoe	4	20	UMHO
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=10UA VCE=10V	hFE	25	75	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=100UA VCE=10V	hFE	30	90	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=10V	hFE	40	120	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=10MA VCE=10V	hFE	50	150	--
1010652-2		2	ALL REQUIREMENTS OF -1					
			SMALL-SIGNAL SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=10V	hfe	80	120	--
1010652-3		2	SMALL-SIGNAL, SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=5V	hfe	75	180	--
			SMALL-SIGNAL, SHORT-CIRCUIT INPUT IMPEDANCE	IC=1MA VCE=5V	hie	--	5000	OHMS
			SMALL-SIGNAL, OPEN CIRCUIT OUTPUT ADMITTANCE	IC=1MA VCE=5V	hoe	--	20	UMHO
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=10UA VCE=10V	hFE	40	100	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=100UA VCE=10V	hFE	60	125	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=10V	hFE	80	150	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=10MA VCE=10V	hFE	90	180	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=300UA VCE=10V	hFE	75	125	--

1010652 C

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DWG. NO. CONTRACT 9-497

DRAWN Splane DATE 10 OCT 63
CHECKED [illegible] Hintz 11 OCT 63
APPROVAL D. B. Test 12 NOV 63
APPROVAL
NASA APPROVAL W J Rhine 11-13-63
MIT APPROVAL W [illegible] 13 Nov 63

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	1010652

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SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	PPK WK
A	REVISED PER TDRR 23179	11/16/65	WK
B	REVISION STATUS CHANGED	1 SEPT 66	JI RFS
C	REVISED PER TDRR 32102	3DEC66	AD

TABLE III CONTINUED

ADDITIONAL ELECTRICAL CHARACTERISTICS AT TC = 25°C & 1000 CPS (UNLESS OTHERWISE SPECIFIED)

NASA PART NUMBER	MANUFACTURER'S DESIGNATION (FOR REF ONLY)	NO. OF SECTIONS PER DEVICE	PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNIT
1010652-4		2	ALL REQUIREMENTS OF -1					
			SWITCHBACK VOLTAGE	I_C = 10 MA, I_B = 0	LV_{CEO}	80	-	VOLTS
			STATIC FORWARD CURRENT TRANSFER RATIO	V_{CE}=1.0VDC I_C= 5MA	h_{FE}	50	100	-
			COLLECTOR TO EMITTER BREAKDOWN VOLTAGE	I_C = 10 MA R_{BE}= 10Ω	BV_{CER}	100	-	VOLTS
			COLLECTOR SATURATION VOLTAGE	I_C = 150 MA I_B = 15 MA	V_{CE} (SAT)	-	5	VOLTS
1010652-5		2	ALL REQUIREMENTS OF -1					
			STATIC FORWARD CURRENT TRANSFER RATIO	V_{CE} = 3.0VDC I_C = 1MA	h_{FE}	50	150	—
			STATIC FORWARD CURRENT TRANSFER RATIO, RATIO (SEE NOTE 1)	V_{CE}=3.0VDC I_C = 1MA	$\frac{h_{FE1}}{h_{FE2}}$	0.95	1	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
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MATERIAL
HEAT TREATMENT
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NASA APPROVAL W J Rhine 12-13-67
MIT APPROVAL WKaffe 13 Nov 67

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NASA DRAWING NO. 1010652
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SHEET 4 OF 4

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REVISIONS

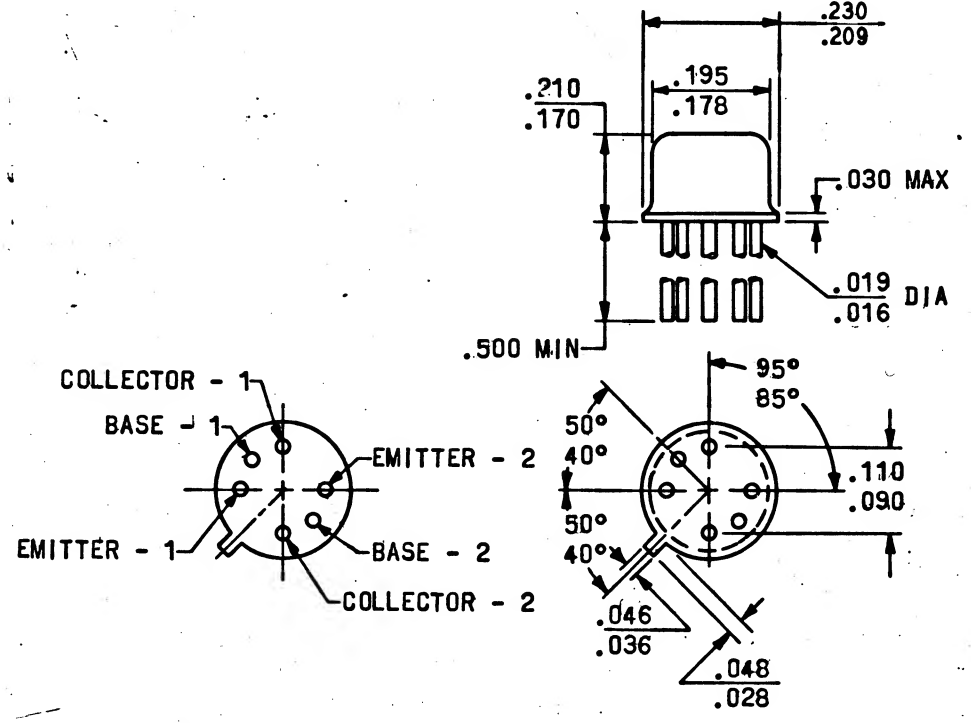
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	D	REPLACES REV C WITH CHANGE PER TDRR 32229	13 JAN 67	PJ

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PERSCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL THE QUALIFICATION REQUIREMENTS OF ND 1002051, UNLESS MODIFIED OR AMMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - D. PRESERVATION, PACKAGING, PACKING, AND CONTAINER MARKING PER ND 1002215, CLASS 1, CODE 2.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) LEAD DATA: KOVAR WITH GOLD PLATING PER ND 1015402 A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
     - (2) MARKING: THE NASA DRAWING NUMBER (LAST THREE DIGITS REQUIRED). DASH NUMBER: AND THE MANUFACTURER'S NAME, TRADEMARK, OR CODE: DATE CODE: LOT CODE: AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND 1002019. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL INCLUDE THE NASA DRAWING NUMBER, THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.
     - (3) MECHANICAL DIMENSIONS PER OUTLINE SHOWN.
   - B. ELECTRICAL REQUIREMENTS: PER TABLE II AND III, PER SECTION
     - (1) COLLECTOR CUTOFF CURRENT (I_{CBO}) AT 100°C
     - (2) EMITTER CUTOFF CURRENT (I_{EBO})
     - (3) SWITCHBACK VOLTAGE (LV_{CED})
     - (4) STATIC FORWARD CURRENT TRANSFER RATIO (h_{FE})
     - (5) STATIC FORWARD CURRENT TRANSFER RATIO, RATIO
     - (6) BASE VOLTAGE DIFFERENTIAL
     - (7) COLLECTOR SATURATION VOLTAGE $V_{CE(SAT)}$
   - C. ISOLATION CHECK:
     - (1) ALL SAMPLES SHALL BE SUBJECTED TO THE FOLLOWING INSPECTION.
     - (2) APPLY 300 VDC, THROUGH A 30 MEGOHM LIMITING RESISTOR, BETWEEN THE CASE AND ALL LEADS ELECTRICALLY TIED TOGETHER.
     - (3) THE RESULTING CURRENT SHALL NOT EXCEED 250 NANOAMPS.

3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL RATING: PER TABLE I PER SECTION
   - B. ELECTRICAL CHARACTERISTICS: PER TABLES II AND III, PER SECTION
   - C. STORAGE AND OPERATING JUNCTION TEMPERATURE: -65°C TO +200°C
   - D. POWER DISSIPATION: (EACH SECTION)
     - (1) 25°C CASE TEMPERATURE: 500 MILLIWATTS
     - (2) 100°C CASE TEMPERATURE: 290 MILLIWATTS
     - (3) 25°C AMBIENT TEMPERATURE: 250 MILLIWATTS
   - E. POWER DISSIPATION (DUAL) TOTAL:
     - (1) 25°C CASE TEMPERATURE: 750 MILLIWATTS
     - (2) 100°C CASE TEMPERATURE: 430 MILLIWATTS
     - (3) 25°C AMBIENT TEMPERATURE: 300 MILLIWATTS



UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
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CODE IDENT NO. 80230
1010652
SCALE 4/1
SHEET 1 OF 5

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	D	REPLACES REV C WITH CHANGE PER TDRR 32223	13 JAN 67	RJ / PJ

REQUIREMENTS: (CONTINUED)

4. SPECIAL CONDITIONING BY SUPPLIER:
   A. ALL UNITS SHALL HAVE SUCCESSFULLY PASSED THE FOLLOWING SCREENING TESTS PERFORMED DURING THE TIME INTERVAL BETWEEN FINAL SEAL AND THE 240 HOUR BURN-IN.
      (1) ACCELERATION AT 20,000 G MINIMUM IN THE Y_1 ORIENTATION PER MIL-STD-750, METHOD 2006, OR IMPACT SHOCK AT 28K G MINIMUM IN THE Y_1 ORIENTATION.
      (2) HELIUM LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION C, PROCEDURE III a OR b, A LEAK RATE OF $1X10^{-8}$ ATM CC/SEC OR GREATER SHALL CONSTITUTE A FAILURE.
      (3) GROSS LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION A. GLYCERIN MAY BE USED IN LIEU OF MINERAL OIL.
   B. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT
      (1) THE FOLLOWING CONDITIONS: (BOTH SECTIONS SIMULTANEOUSLY)
         a. AMBIENT TEMPERATURE: 25°C ± 5°C
         b. COLLECTOR VOLTAGE V_{CE}: 45 ± 5 VDC PER SECTION.
         c. POWER DISSIPATION: 100MW ± 10% PER SECTION.
   C. THE MANUFACTURER SHALL DETERMINE AND RECORD THE
      (1) FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
         a. EMITTER CUTOFF CURRENT, I_{EBO}
         b. COLLECTOR CUTOFF CURRENT, I_{CBO}
         c. COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$
         d. STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE}, SEE NOTE 3.
   D. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN h_{FE}, OR HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} (THE ABSOLUTE CHANGE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.

NOTES:

1. LOWEST VALUE OF hFE SHALL BE $h_{FE}1$ (NUMERATOR).
2. TO BE MEASURED ON QUANTECH NOISE ANALYZER MOD. 310 OR 311 OR EQUIVALENT.
3. AT LOWEST SPECIFIED COLLECTOR CURRENT
4. PULSE CONDITIONS = LENGTH ≦ 300 U SEC. DUTY CYCLE ≦ 1%

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE DECIMALS + − 3 PLACE DECIMALS + − ANGLES + −	M I T INSTRUMENTATION LAB CAMBRIDGE MASS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN S. LANE DATE 16 OCT 63 CHECKED G.L. MINTZ 11 OCT 63 APPROVAL D.R. TEST 12 NOV 63 CONTRACT NAS 9-497	TRANSISTOR NPN, SILICON, DUALSECTION SPECIFICATION CONTROL DRAWING
MATERIAL	NASA APPROVAL W.J. RHINE 13NOV 63	SIZE C CODE IDENT NO. 80230 1010652
APPROVAL	MIT APPROVAL W. KUPFER 13 NOV 63	SCALE NONE SHEET 2 OF 5

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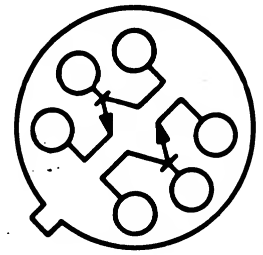
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	D	REPLACES REVISION C WITH CHANGE PER TDRR 32229	13 JAN 67	P7

TABLE II

ELECTRICAL CHARACTERISTIC AT T_C = 25°C & 1000 HZ
(UNLESS OTHERWISE SPECIFIED)

PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNITS
COLLECTOR CUTOFF CURRENT	IE = 0 VCB = 80V	ICBO	-	2	NA
COLLECTOR CUTOFF CURRENT	IE = 0 VCB = 80V TC = 150°C	ICBO	-	10	UA
EMITTER CUTOFF CURRENT	IC = 0 VEB = 5V	IEBO	-	2	NA
EMITTER TO BASE BREAKDOWN VOLTAGE	IE = 100MA IC = 0	BVEBO	7	-	VOLTS
COLLECTOR TO EMITTER BREAKDOWN VOLTAGE (SEE NOTE 4)	IC = 10MA RBE = 10Ω	BVCER	80	-	VOLTS
COLLECTOR TO BASE BREAKDOWN VOLTAGE	IC = 100UA IE = 0	BVCBO	100	-	VOLTS
SWITCHBACK VOLTAGE (SEE NOTE 4)	IC = 30MA IB = 0	LVCEO	60	-	VOLTS
STATIC FORWARD CURRENT TRANSFER RATIO, RATIO (SEE NOTE 1)	IC = 1MA VCE = 10V	$\frac{hFE1}{hFE2}$	.9	1	-
STATIC FORWARD CURRENT TRANSFER RATIO, RATIO (SEE NOTE 1)	IC = 100UA VCE = 10V	$\frac{hFE1}{hFE2}$	.9	1	-
COLLECTOR SATURATION VOLTAGE	IC = 50MA IB = 5MA	VCE(SAT)	-	1.2	VOLTS
BASE SATURATION VOLTAGE	IC = 50MA IB = 5MA	VBE(SAT)	-	.9	VOLTS
BASE VOLTAGE DIFFERENTIAL (ABSOLUTE VALUE)	IC = 1MA VCE = 5V	| VBE 1- VBE 2|	-	5	MV
BASE VOLTAGE DIFFERENTIAL (ABSOLUTE VALUE)	IC = 100UA VCE = 5V	| VBE 1- VBE 2|	-	3	MV
BASE VOLTAGE DIFFERENTIAL CHANGE	IC = 100UA VCE = 5V TA =-55°C TO+125°C	Δ(VBE 1- VBE 2)	-	10	UV/°C
SMALL - SIGNAL, SHORT - CIRCUIT INPUT IMPEDANCE	IC = 1MA VCB = 5V	hib	20	30	OHMS
OUTPUT CAPACITANCE	IE = 0 VCB = 10V f = 140KC	Cob	-	15	UUF
INPUT CAPACITANCE	IC = 0 VEB = 0.5V f = 140KC	Cib	-	85	UUF
NOISE FIGURE	IC = 300UA VCE = 10V BW = 1CYCLE Rg = 510Ω	NF	-	8	db
SMALL-SIGNAL, SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC = 50MA VCE = 10V f = 20MC	hfe	3	-	-
COLLECTOR CUTOFF CURRENT	VCB = 80V TC = 100°C	ICBO	-	1	UA
NOISE VOLTAGE (SEE NOTE 2)	VCE = 5V IC = 100UA F = 1KC RG = 1KΩ	-	-	.015	UV/√~



GRAPHICAL SYMBOL
ELEMENTS INSULATED FROM CASE

TABLE I

MAXIMUM RATINGS T_C = 25°C
(UNLESS OTHERWISE SPECIFIED)

COLLECTOR VOLTAGE (V_{CEO})	COLLECTOR VOLTAGE (V_{CBO})	EMITTER VOLTAGE (V_{EBO})	POWER DISSIPATION (EACH ELEMENT)	POWER DISSIPATION (DUAL)
VDC	VDC	VDC	WATTS	WATTS
60	100	7	.5	.75

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE DECIMALS + − 3 PLACE DECIMALS + − ANGLES + −	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS.	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN SPLANE DATE 10 OCT 63 CHECKED G.L. HINTZ 11 OCT 63 APPROVAL D.R. TEST 12 NOV 63 CONTRACT NAS 9-497	TRANSISTOR NPN, SILICON, DUALSECTION SPECIFICATION CONTROL DRAWING
MATERIAL	NASA APPROVAL W. J. RHINE 13 NOV 63	SIZE C CODE IDENT NO. 80230 1010652
APPROVAL	MIT APPROVAL W. KUPFER 13 NOV 63	SCALE 4/1 SHEET 3 OF 5

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REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED
	D	REPLACES REV C WITH CHANGE PER TDRR 32229	13JAN67	PT

TABLE III

ADDITIONAL ELECTRICAL CHARACTERISTIC AT TC = 25°C & 1000 HZ(UNLESS OTHERWISE SPECIFIED)

DASH NO.	NO. OR ELEMENTS PER DEVICE	PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN.	LIMITS MAX.	UNIT	MANUFACTURER'S TYPE DESIGNATION (FOR REF ONLY)
-1	2	SMALL-SIGNAL, SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC = 1MA VCE = 5V	hfe	50	150	-	2N2980
		SMALL-SIGNAL, SHORT-CIRCUIT INPUT IMPEDANCE	IC = 1MA VCE = 5V	hie	1250	5000	OHMS	
		SMALL-SIGNAL, OPEN CIRCUIT OUTPUT ADMITTANCE	IC = 1MA VCE = 5V	hoe	4	20	UMHO	
		STATIC FORWARD CURRENT TRANSFER RATIO	IC = 10UA VCE = 10V	hFE	25	75	-	
		STATIC FORWARD CURRENT TRANSFER RATIO	IC=100UA VCE = 10V	hFE	30	90	-	
		STATIC FORWARD CURRENT TRANSFER RATIO	IC = 1MA VCE = 10V	hFE	40	120	-	
		STATIC FORWARD CURRENT TRANSFER RATIO	IC = 10MA VCE = 10V	hFE	50	150	-	
-2	2	ALL REQUIREMENTS OF -1						
		SMALL-SIGNAL, SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC= 1MA VCE = 10V	hfe	80	120	-	
-3	2	SMALL-SIGNAL, SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC = 1MA VCE = 5V	hfe	75	180	-	
		SMALL-SIGNAL, SHORT-CIRCUIT INPUT IMPEDANCE	IC = 1MA VCE = 5V	hie	-	5000	OHMS	
		SMALL-SIGNAL, OPEN CIRCUIT OUTPUT ADMITTANCE	IC = 1MA VCE = 5V	hoe	-	20	UMHO	
		STATIC FORWARD CURRENT TRANSFER RATIO	IC = 10UA VCE = 10V	hFE	40	100	-	
		STATIC FORWARD CURRENT TRANSFER RATIO	IC =100UA VCE = 10V	hFE	60	125	-	
		STATIC FORWARD CURRENT TRANSFER RATIO	IC = 1MA VCE = 10V	hFE	80	150	-	
		STATIC FORWARD CURRENT TRANSFER RATIO	IC = 10MA VCE = 10V	hFE	90	180	-	
		STATIC FORWARD CURRENT TRANSFER RATIO	IC =300UA VCE = 10V	hFE	75	125	-	

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN SPLANE DATE 10 OCT 63
CHECKED G. L. HINTZ 11 OCT 63
APPROVAL D. R. TEST 12 NOV 63
CONTRACT NAS 9-497
NASA APPROVAL W. J. RHINE 13 NOV 63
MIT APPROVAL W. KUPFER 13 NOV 63

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TRANSISTOR
NPN, SILICON, DUALSECTION
SPECIFICATION CONTROL DRAWING

SIZE C
CODE IDENT NO. 80230
1010652
SCALE NONE
SHEET 4 OF 5

MIL-1000E D

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REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED
	D	REPLACES REV C WITH CHANGE PER TDRR 32229, THIS SHEET ADDED	12 JAN 67	

TABLE III CONTINUED

ADDITIONAL ELECTRICAL CHARACTERISTIC AT TC = 25°C & 1000 HZ(UNLESS OTHERWISE SPECIFIED)

DASH NO.	NO. OF SECTIONS PER DEVICE	PARAMETER	TEST CONDITION	SYMBOL	LIMITS MIN.	LIMITS MAX.	UNIT	MANUFACTURER'S TYPE DESIGNATION (FOR REF ONLY)
-4	2	ALL REQUIREMENTS OF -1						
		SWITCHBACK VOLTAGE	I_C = 10MA I_B = 0	LV_{CEO}	80	-	VOLTS	
		STATIC FORWARD CURRENT TRANSFER RATIO	V_{CE}=1.0VDC I_C = 5MA	h_{FE}	50	100	-	
		COLLECTOR TO EMITTER BREAKDOWN VOLTAGE	I_C = 10MA R_{BE} = 10Ω	BV_{CER}	100	-	VOLTS	
		COLLECTOR SATURATION VOLTAGE	I_C = 150MA I_B = 15MA	V_{CE} (SAT)	-	5	VOLTS	
-5	2	ALL REQUIREMENTS OF -1						
		STATIC FORWARD CURRENT TRANSFER RATIO	V_{CE}=3.0VDC I_C = 1MA	h_{FE}	50	150	-	
		STATIC FORWARD CURRENT TRANSFER RATIO, RATIO (SEE NOTE 1)	V_{CE}=3.0VDC I_C = 1MA	$\frac{h_{FE1}}{h_{FE2}}$	0.95	1		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

2 PLACE DECIMALS	3 PLACE DECIMALS	ANGLES
+	+	+
–	–	–

DO NOT SCALE THIS DRAWING

MATERIAL

APPROVAL

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DRAWN SPLANE DATE 10 OCT 63
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TRANSISTOR
NPN, SILICON, DUALSECTION
SPECIFICATION CONTROL DRAWING

SIZE C
CODE IDENT NO. 80230
1010652
SCALE 4:1
SHEET 5 OF 5

– | 1010652

REVISIONS 04623			
SYM	DESCRIPTION	DATE	APPROVAL
–	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	RPK WK

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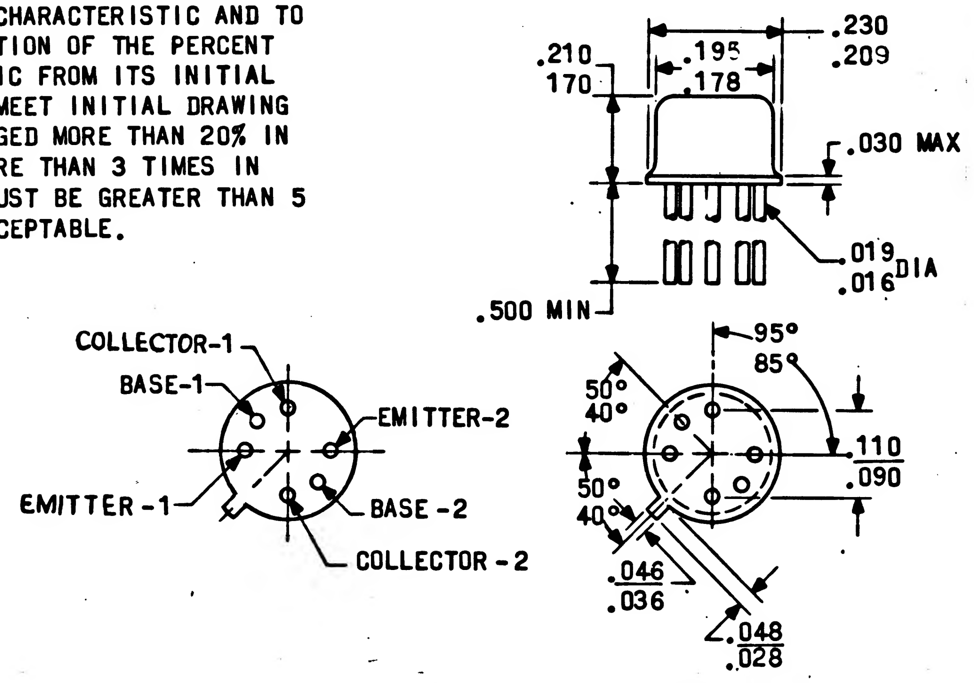
REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOL, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL THE QUALIFICATION REQUIREMENTS OF ND 1002051, UNLESS MODIFIED OR AMMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - D. UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-S-19491 LEVEL A.
   - E. UNITS SHALL BE IN ACCORDANCE WITH MIL-S-19500 IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) LEAD DATA: KOVAR WITH GOLD PLATING PER ND 1015402 A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
     - (2) MARKING: THE MANUFACTURER'S NAME. TRADEMARK OR CODE; NASA DRAWING NUMBER, (LAST THREE DIGITS ONLY REQ'D), DASH NUMBER AND REVISION LETTER; DATE CODE; LOT CODE AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND1002019 MANUFACTURER'S PART OR TYPE NUMBER MAY APPEAR ON THE PART AND PACKAGE. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-S-19491 AND SHALL INCLUDE THE NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER.
     - (3) MECHANICAL DIMENSIONS PER OUTLINE SHOWN.
   - B. ELECTRICAL REQUIREMENTS: PER TABLE II AND III, PER SECTION
     - (1) COLLECTOR CUTOFF CURRENT (I_{CBO}) AT 100°C
     - (2) EMITTER CUTOFF CURRENT (I_{EBO})
     - (3) SWITCHBACK VOLTAGE (LV_{CED})
     - (4) STATIC FORWARD CURRENT TRANSFER RATIO (h_{FE})
     - (5) STATIC FORWARD CURRENT TRANSFER RATIO, RATIO
     - (6) BASE VOLTAGE DIFFERENTIAL.
     - (7) COLLECTOR SATURATION VOLTAGE $V_{CE(SAT)}$
3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL RATING: PER TABLE I PER SECTION
   - B. ELECTRICAL CHARACTERISTICS: PER TABLES II AND III, PER SECTION
   - C. STORAGE AND OPERATING JUNCTION TEMPERATURE: -65°C TO +200°C
   - D. POWER DISSIPATION: (EACH SECTION)
     - (1) 25°C CASE TEMPERATURE: 500 MILLIWATTS
     - (2) 100°C CASE TEMPERATURE: 290 MILLIWATTS.
     - (3) 25°C AMBIENT TEMPERATURE: 250 MILLIWATTS.
   - E. POWER DISSIPATION (DUAL) TOTAL:
     - (1) 25°C CASE TEMPERATURE: 750 MILLIWATTS
     - (2) 100°C CASE TEMPERATURE: 430 MILLIWATTS
     - (3) 25°C AMBIENT TEMPERATURE: 300 MILLIWATTS.
   - F. LIFE TEST CONDITIONS FOR ND 1002051 SAME AS BURN-IN CONDITIONS.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT
     - (1) THE FOLLOWING CONDITIONS: (BOTH SECTIONS SIMULTANEOUSLY)
       - (a) AMBIENT TEMPERATURE: 25°C ± 5°C
       - (b) COLLECTOR VOLTAGE V_{CE}: 45 ± 5 VDC PER SECTION.
       - (c) POWER DISSIPATION: 100 MW ± 10% PER SECTION.
   - B. THE MANUFACTURER SHALL DETERMINE AND RECORD THE
     - (1) FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
       - (a) EMITTER CUTOFF CURRENT, I_{EBO}.
       - (b) COLLECTOR CUTOFF CURRENT, I_{CBO}.
       - (c) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$
       - (d) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE}, SEE NOTE 3.
   - C. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF THE ABSOLUTE VALUE OF EACH CHARACTERISTIC AND TO SHOW THE FREQUENCY DISTRIBUTION OF THE PERCENT CHANGE OF EACH CHARACTERISTIC FROM ITS INITIAL READING. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN h_{FE}, OR HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} (THE ABSOLUTE CHANGE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.



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SHEET 1	SHEET 2	SHEET 3	SHEET 4
REVISION STATUS OF SHEETS			

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

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CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497

DRAWN Splane DATE 10 OCT 63
CHECKED 11 OCT 63
APPROVAL D. R. Test 12 NOV 63
APPROVAL
NASA APPROVAL W J Rhine 11-13-63
MIT APPROVAL 13 Nov 63

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TRANSISTOR,
NPN, SILICON, DUALSECTION

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010652
SCALE
WT
SHEET 1 OF 4

INCHES
0 1 2
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— 1010652

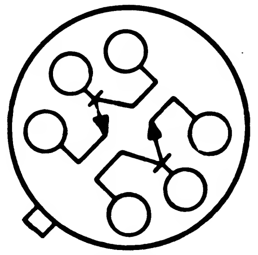
REVISIONS 04623			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	PDK WK

TABLE II

ELECTRICAL CHARACTERISTIC AT T_C = 25°C & 1000 CPS
(UNLESS OTHERWISE SPECIFIED)

PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNITS
COLLECTOR CUTOFF CURRENT	IE = 0 VCB = 80V	ICBO	-	2	NA
COLLECTOR CUTOFF CURRENT	IE = 0 VCB = 80V TC = 150°C	ICBO	-	10	UA
EMITTER CUTOFF CURRENT	IC = 0 VEB = 5V	IEBO	-	2	NA
EMITTER TO BASE BREAKDOWN VOLTAGE	IE = 100UA IC = 0	BVEBO	7	-	VOLTS
COLLECTOR TO EMITTER BREAKDOWN VOLTAGE (SEE NOTE 4)	IC = 100MA RBE = 10Ω	BVCER	80	-	VOLTS
COLLECTOR TO BASE BREAKDOWN VOLTAGE	IC = 100UA IE = 0	BVCBO	100	-	VOLTS
SWITCHBACK VOLTAGE (SEE NOTE 4)	IC = 30MA IB = 0	LVCEO	60	-	VOLTS
STATIC FORWARD CURRENT TRANSFER RATIO, RATIO (SEE NOTE 1)	IC = 1MA VCE = 10V	$\frac{h_{FE}1}{h_{FE}2}$	.9	1	-
STATIC FORWARD CURRENT TRANSFER RATIO, RATIO (SEE NOTE 1)	IC = 100UA VCE = 10V	$\frac{h_{FE}1}{h_{FE}2}$	.9	1	-
COLLECTOR SATURATION VOLTAGE	IC = 50MA IB = 5MA	VCE(SAT)	-	1.2	VOLTS
BASE SATURATION VOLTAGE	IC = 50MA IB = 5MA	VBE(SAT)	-	.9	VOLTS
BASE VOLTAGE DIFFERENTIAL (ABSOLUTE VALUE)	IC = 1MA VCE = 5V	1 VBE 1- VBE 21	-	5	MV
BASE VOLTAGE DIFFERENTIAL (ABSOLUTE VALUE)	IC = 100UA VCE = 5V	1 VBE 1- VBE 21	-	3	MV
BASE VOLTAGE DIFFERENTIAL CHANGE	IC = 100UA VCE = 5V TA =-55°C TO+125°C	Δ (VBE 1- VBE 2)	-	10	UV/°C
SMALL - SIGNAL, SHORT - CIRCUIT INPUT IMPEDANCE	IC = 1MA VCB = 5V	hib	20	30	OHMS
OUTPUT CAPACITANCE	IE = 0 VCB = 10V f = 140KC	Cob	-	15	UUF
INPUT CAPACITANCE	IC = 0 VEB = 0.5V f = 140KC	Cib	-	85	UUF
NOISE FIGURE	IC = 300UA VCE = 10V BW = 1 CYCLE Rg = 510Ω	NF	-	8	db
SMALL-SIGNAL, SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC = 50MA VCE = 10V f = 20MC	hfe	3	-	-
COLLECTOR CUTOFF CURRENT	VCB = 80V TC = 100°C	ICBO	-	1	UA
NOISE VOLTAGE (SEE NOTE 2)	VCE = 5V IC = 100UA F = 1KC Rg = 1KΩ	-	-	.015	UV/√~

MASTER



GRAPHICAL SYMBOL
ELEMENTS INSULATED FROM CASE

NOTES:
1. LOWEST VALUE OF hFE SHALL BE $h_{FE}1$ (NUMERATOR).
2. TO BE MEASURED ON QUANTECH NOISE ANALYZER MOD. 310 OR 311 OR EQUIVALENT.
3. AT LOWEST SPECIFIED COLLECTOR CURRENT
4. PULSE CONDITIONS = LENGTH ≦ 300 U SEC. DUTY CYCLE ≦ 1%

TABLE I

MAXIMUM RATINGS T_C = 25°C
(UNLESS OTHERWISE SPECIFIED)

COLLECTOR VOLTAGE (V_{CEO})	COLLECTOR VOLTAGE (V_{CBO})	EMITTER VOLTAGE (V_{EBO})	POWER DISSIPATION (EACH ELEMENT)	POWER DISSIPATION (DUAL)
VDC	VDC	VDC	WATTS	WATTS
60	100	7	.5	.75

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
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MIT APPROVAL W Kupfer 13 Nov 63

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TRANSISTOR
NPN, SILICON, DUALSECTION

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010652
SCALE
WT
SHEET 2 OF 4

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

—	1010652

REVISIONS 04623			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	RPK WK

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TABLE III

ADDITIONAL ELECTRICAL CHARACTERISTIC AT TC = 25°C & 1000 CPS (UNLESS OTHERWISE SPECIFIED)

NASA PART NUMBER	MANUFACTURER'S TYPE DESIGNATION (FOR REF ONLY)	NO. OR ELEMENTS PER DEVICE	PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS		UNIT
						MIN	MAX	
1010652-1	2N2980	2	SMALL-SIGNAL, SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=5V	hfe	50	150	--
			SMALL-SIGNAL, SHORT-CIRCUIT INPUT IMPEDANCE	IC=1MA VCE=5V	hie	1250	5000	OHMS
			SMALL-SIGNAL, OPEN CIRCUIT OUTPUT ADMITTANCE	IC=1MA VCE=5V	hoe	4	20	UMHO
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=10UA VCE=10V	hFE	25	75	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=100UA VCE=10V	hFE	30	90	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=10V	hFE	40	120	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=10MA VCE=10V	hFE	50	150	--
1010652-2		2	ALL REQUIREMENTS OF -1					
			SMALL-SIGNAL SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=10V	hfe	80	120	--
1010652-3		2	SMALL-SIGNAL, SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=5V	hfe	75	180	--
			SMALL-SIGNAL, SHORT-CIRCUIT INPUT IMPEDANCE	IC=1MA VCE=5V	hie	--	5000	OHMS
			SMALL-SIGNAL, OPEN CIRCUIT OUTPUT ADMITTANCE	IC=1MA VCE=5V	hoe	--	20	UMHO
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=10UA VCE=10V	hFE	40	100	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=100UA VCE=10V	hFE	60	125	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=1MA VCE=10V	hFE	80	150	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=10MA VCE=10V	hFE	90	180	--
			STATIC FORWARD CURRENT TRANSFER RATIO	IC=300UA VCE=10V	hFE	75	125	--

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NAS CONTRACT 9-497

DRAWN Solano DATE 10 OCT 63
CHECKED 11 OCT63
APPROVAL D. B. Test 12 NOV 63
APPROVAL

NASA APPROVAL 11-13-63
MIT APPROVAL 13 Nov 63

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TRANSISTOR
NPN, SILICON, DUALSECTION
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010652
SCALE NONE	WT	SHEET 3 OF 4

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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— 1010652

REVISIONS 04623

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	WK

TABLE III CONTINUED

ADDITIONAL ELECTRICAL CHARACTERISTICS AT TC = 25°C & 1000 CPS (UNLESS OTHERWISE SPECIFIED)

NASA PART NUMBER	MANUFACTURER'S DESIGNATION (FOR REF ONLY)	NO. OF SECTIONS PER DEVICE	PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNIT
1010652-4		2	ALL REQUIREMENTS OF -1					
			SWITCHBACK VOLTAGE	I_C = 10 MA, I_B = 0	LV_{CEO}	80	-	VOLTS
			STATIC FORWARD CURRENT TRANSFER RATIO	V_{CE}=1.0VDC I_C= 5MA	h_{FE}	50	- 100	-
			COLLECTOR TO EMITTER BREAKDOWN VOLTAGE	I_C = 100MA R_{BE}= 10Ω	BV_{CER}	100	-	VOLTS
			COLLECTOR SATURATION VOLTAGE	I_C = 150 MA I_B = 15 MA	V_{CE} (SAT)	-	5	VOLTS

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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CAMBRIDGE, MASS
DWG. NO.
CONTRACT NAS 9-497
DRAWN Splane DATE 10 OCT 63
CHECKED 11 OCT 63
APPROVAL 12 NOV 63
APPROVAL
NASA APPROVAL W J 11-13-63
MIT APPROVAL WK 13 NOV 63

MANNED SPACECRAFT CENTER
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TRANSISTOR
NPN, SILICON, DUALSECTION
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010652
SCALE
WT
SHEET 4 OF 4

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

A 1010653

REVISIONS 04623			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	wK.
A	REVISED PER TDRR 23181	11/9/66	wK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002051. UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - C. SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PER ND 1015404, CLASS 2.
   - D. PRESERVATION, PACKAGING, PACKING, AND CONTAINER MARKING PER ND 1002215, CLASS 1, CODE 2

2. INSPECTION AND ACCEPTANCE:
   - A. LEAD DATA: KOVAR WITH GOLD PLATING PER 1015402. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
   - B. ELECTRICAL CHARACTERISTICS: PER TABLE II.
     - (1) STATIC FORWARD CURRENT TRANSFER RATIO (h_{FE})
     - (2) COLLECTOR CUTOFF CURRENT (I_{CBO}) AT 100°C
     - (3) COLLECTOR SATURATION VOLTAGE ($V_{CE(SAT)}$)
     - (4) SWITCHBACK VOLTAGE (LV_{CEO})
     - (5) BASE SATURATION VOLTAGE ($V_{BE(SAT)}$)
   - C. MARKING: THE NASA DRAWING NUMBER (LAST THREE DIGITS REQUIRED) AND THE MANUFACTURER'S NAME, TRADEMARK OR CODE: DATE CODE: LOT CODE: AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND1002019. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL INCLUDE THE NASA DRAWING NUMBER. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

3. DESIGN REQUIREMENTS:
   - A. JUNCTION TEMPERATURE: -65°C TO +200°C
   - B. ELECTRICAL RATING: PER TABLE I PER SECTION.
   - C. ELECTRICAL SPECIFICATION: PER TABLE II
   - D. POWER DISSIPATION (EACH ELEMENT)
     - (1) AT 25°C AMBIENT TEMPERATURE: 250 MILLIWATTS MAXIMUM.
       - (a) DERATING: LINEAR TO +200°C.
     - (2) AT 25°C CASE TEMPERATURE: 500 MILLIWATTS MAXIMUM.
       - (b) DERATING: 2.86 MILLIWATTS PER DEGREE CENTIGRADE.
   - E. POWER DISSIPATION (DUAL DEVICE)
     - (1) AT 25°C AMBIENT TEMPERATURE: 300 MILLIWATTS MAXIMUM
       - (a) DERATING: LINEAR TO +200°C
     - (2) AT 25°C CASE TEMPERATURE:750 MILLIWATTS MAXIMUM
       - (b) DERATING: 4.28 MILLIWATTS PER DEGREE CENTIGRADE.

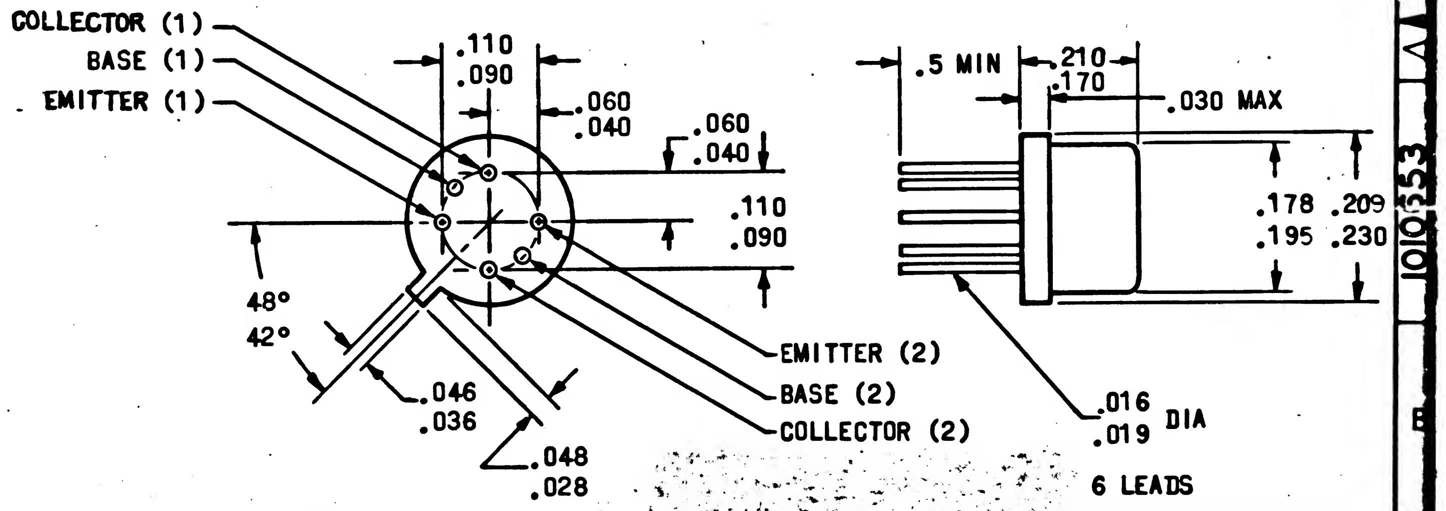
4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. ALL UNITS SHALL HAVE SUCCESSFULLY PASSED THE FOLLOWING SCREENING TESTS PERFORMED DURING THE TIME INTERVAL BETWEEN FINAL SEAL AND THE 240 HOUR BURN-IN.
     - (1) ACCELERATION AT 20,000 G MINIMUM IN THE Y_1 ORIENTATION PER MIL-STD-750, METHOD 2006, OR IMPACT SHOCK AT 28K G MINIMUM IN THE Y_1 ORIENTATION.
     - (2) HELIUM LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION C, PROCEDURE III a OR b. A LEAK RATE OF 1 X 10^{-8} ATM CC/SEC OR GREATER SHALL CONSTITUTE A FAILURE.
     - (3) GROSS LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION A. GLYCERIN MAY BE USED IN LIEU OF MINERAL OIL.
   - B. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS (BOTH SECTIONS SIMULTANEOUSLY)
     1. AMBIENT TEMPERATURE° +25° ± 5°C.
     2. COLLECTOR VOLTAGE VCB: 20 ± 1 VOLT PER SECTION.

4. B. 3. POWER DISSIPATION: 100±10% MILLIWATTS PER UNIT.

C. THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
- (1) BASE SATURATION VOLTAGE, $V_{BE(SAT)}$
- (2) COLLECTOR CUTOFF CURRENT, I_{CBO}
- (3) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$
- (4) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE} (AT LOWEST SPECIFIED COLLECTOR CURRENT).

D. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS.

UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN h_{FE}, HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} (THE ABSOLUTE INCREASE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.



PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

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APPROVAL
NASA APPROVAL W J Rhine 11-13-63
MIT APPROVAL 13 Nov 66

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TRANSISTOR, DUAL, NPN, SILICON, LOW STORAGE TIME

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	1010653

SCALE NONE
WT
SHEET 1 OF 2

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1010653 A

REVISIONS 04623

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	wk
A	REVISED PER TDRR 23181	11/5/65	wk

TABLE I

MANUFACTURER'S ABSOLUTE MAXIMUM RATINGS TC = +25°C

COLLECTOR VOLTAGE (V_{CB})	EMITTER VOLTAGE (V_{EB})	COLLECTOR VOLTAGE (V_{CE})	COLLECTOR POWER DISSIPATION	
V_{DC}	V_{DC}	V_{DC}	W	
40	5	15	.75 (.50 PER UNIT)	

TABLE II

ELECTRICAL CHARACTERISTICS AT TC = +25°C (UNLESS OTHERWISE SPECIFIED) PER SECTION

PARAMETER	CONDITION	SYMBOL	SPECIFICATION LIMITS MINIMUM	MAXIMUM	UNIT
STATIC FORWARD CURRENT TRANSFER RATIO	I_C=10mA, V_{CE}=1.0 V	h_{FE}	30	-	-
BASE SATURATION VOLTAGE	I_C=10 mA, I_B=1.0 mA	V_{BE}(SAT)	0.7	0.85	VOLTS
COLLECTOR SATURATION VOLTAGE	I_C=10 mA, I_B=1.0 mA	V_{CE}(SAT)	-	0.25	VOLTS
HIGH FREQUENCY CURRENT GAIN	I_C=20 mA, V_{CE}=10 V, f=100mc	h_{FE}	3.0	-	-
OUTPUT CAPACITANCE	I_E=0, V_{CB}=10 V, f=140kc	C_{ob}	-	6.0	pf
COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=20 V	I_{CBO}	-	25	nA
COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=20 V TC=150°C	I_{CBO}	-	15	uA
COLLECTOR TO BASE BREAKDOWN VOLTAGE	I_C=1.0 uA, I_E=0	BV_{CBO}	40	-	VOLTS
SWITCHBACK VOLTAGE	I_C=30 mA(PULSED), I_B=0	LV_{CEO}	15	-	VOLTS
EMITTER TO BASE BREAKDOWN VOLTAGE	I_C=0, I_E=10 uA	BV_{EBO}	5.0	-	VOLTS
CHARGE STORAGE TIME CONSTANT(SEE FIG.1)	$I_C=I_{B1}=I_{B2}$=20 mA, PW>200 nsec	τ_s	—	25	nsec
COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=20V TC=100°C	I_{CBO}		3	uA

CHARGE STORAGE TIME-CONSTANT TEST CIRCUIT

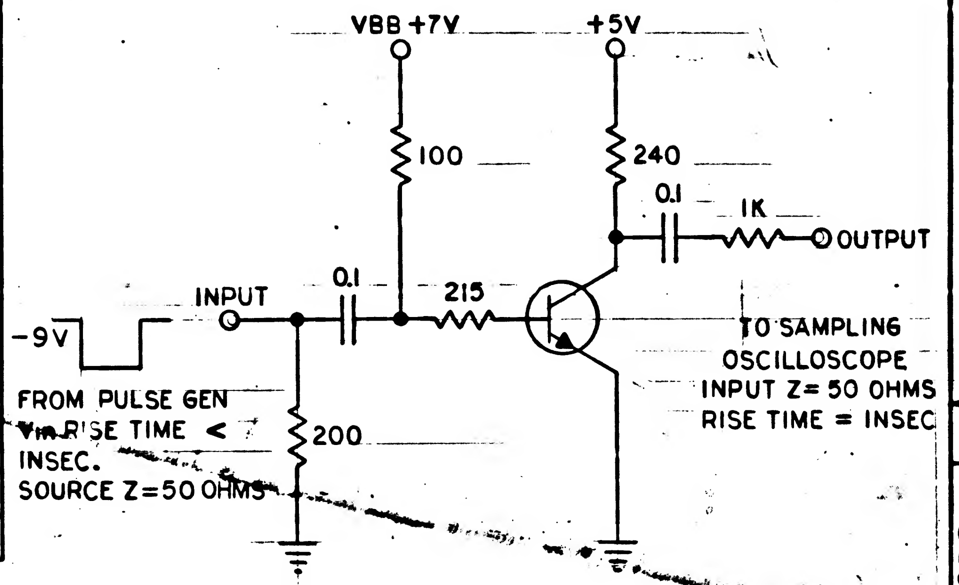

FIGURE I

1010653 A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
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DRAWN Splane DATE 10 OCT 63
CHECKED 11 OCT 63
APPROVAL 12 NOV 63
APPROVAL

NASA APPROVAL W J Rhine 11-13-63
MIT APPROVAL 11 Nov 63

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TRANSISTOR, DUAL, NPN,
SILICON, LOW STORAGE TIME

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	1010653
SCALE NONE	WT	SHEET 2 OF 2

MASTER

—	1010653

REVISIONS 04623			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	EJP. WK.

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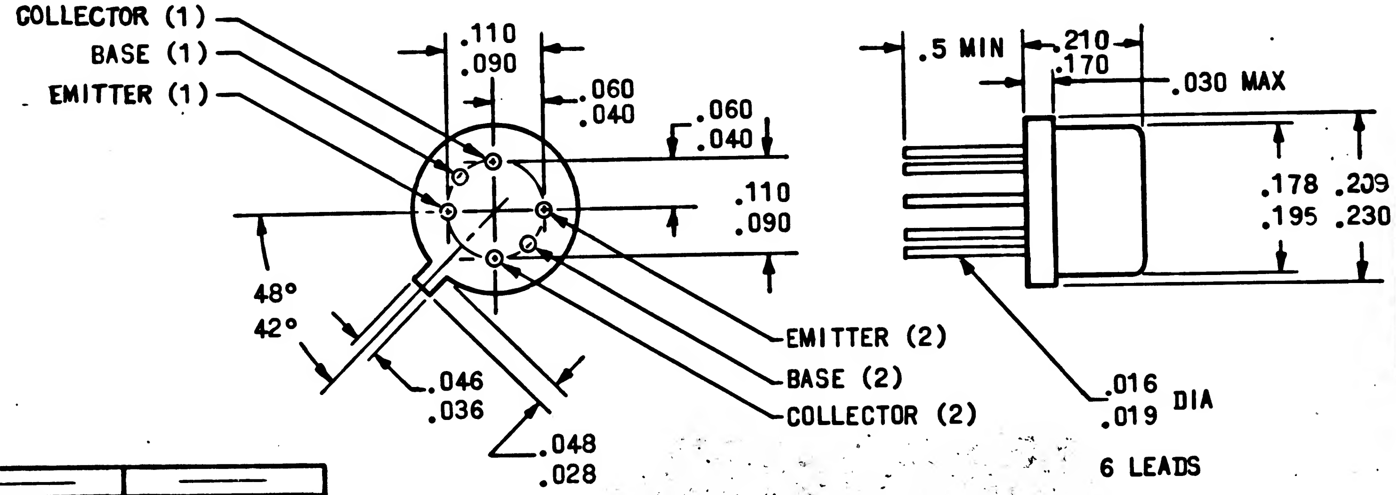
REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002051.
   - C. LIFE TEST CONDITIONS SAME AS BURN-IN CONDITIONS.
   - D. SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PER ND 1015404, CLASS 2.
   - E. PACKAGING AND PACKING: UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-S-19491, LEVEL A, IN BOTH INSTANCES. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-S-19491 AND SHALL INCLUDE THE NASA DRAWING NUMBER AND REVISION LETTER.
2. INSPECTION AND ACCEPTANCE:
   - A. LEAD DATA: KOVAR WITH GOLD PLATING PER 1015402. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
   - B. ELECTRICAL CHARACTERISTICS: PER TABLE II.
     - (1) STATIC FORWARD CURRENT TRANSFER RATIO (h_{FE})
     - (2) COLLECTOR CUTOFF CURRENT (I_{CBO}) AT 100°C
     - (3) COLLECTOR SATURATION VOLTAGE ($V_{CE(SAT)}$)
     - (4) SWITCHBACK VOLTAGE (LV_{CEO})
     - (5) BASE SATURATION VOLTAGE ($V_{BE(SAT)}$)
   - C. MARKING: MARK UNITS PER ND1002019 WITH THE MANUFACTURER'S NAME, TRADEMARK OR CODE; DATE CODE; LOT CODE AND SERIAL NUMBER, NASA DRAWING NUMBER (LAST THREE DIGITS ONLY REQ'D) DASH NUMBER AND REVISION LETTER. MANUFACTURER'S PART OR TYPE NUMBER MAY APPEAR ON THE PART AND PACKAGE.
3. DESIGN REQUIREMENTS:
   - A. JUNCTION TEMPERATURE: -65°C TO +200°C
   - B. ELECTRICAL RATING: PER TABLE I PER SECTION.
   - C. ELECTRICAL SPECIFICATION: PER TABLE II
   - D. POWER DISSIPATION (EACH ELEMENT)
     - (1) AT 25°C AMBIENT TEMPERATURE: 250 MILLIWATTS MAXIMUM.
       - (a) DERATING: LINEAR TO +200°C.
     - (2) AT 25°C CASE TEMPERATURE: 500 MILLIWATTS MAXIMUM.
       - (b) DERATING: 2.86 MILLIWATTS PER DEGREE CENTIGRADE.
   - E. POWER DISSIPATION (DUAL DEVICE)
     - (1) AT 25°C AMBIENT TEMPERATURE: 300 MILLIWATTS MAXIMUM
       - (a) DERATING: LINEAR TO +200°C
     - (2) AT 25°C CASE TEMPERATURE: 750 MILLIWATTS MAXIMUM
       - (b) DERATING: 4.28 MILLIWATTS PER DEGREE CENTIGRADE.
4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS (BOTH SECTIONS SIMULTANEOUSLY)
     - (1) AMBIENT TEMPERATURE: +25° ± 5°C.
     - (2) COLLECTOR VOLTAGE V_{CB}: 20 ± 1 VOLT PER SECTION.
     - (3) POWER DISSIPATION: 100 ± 10% MILLIWATTS PER UNIT
   - B. THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
     - (1) BASE SATURATION VOLTAGE, $V_{BE(SAT)}$
     - (2) COLLECTOR CUTOFF CURRENT, I_{CBO}
     - (3) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$
     - (4) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE} (AT LOWEST SPECIFIED COLLECTOR CURRENT).
   - C. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF THE ABSOLUTE VALUE OF EACH CHARACTERISTIC AND TO SHOW THE FREQUENCY DISTRIBUTION OF THE PERCENT CHANGE OF EACH CHARACTERISTIC FROM ITS INITIAL READING. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN h_{FE}, HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} (THE ABSOLUTE INCREASE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.



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SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

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TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

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DWG. NO.
CONTRACT NAS 9-497
DRAWN Squire DATE 10 OCT 63
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APPROVAL D. R. Test 12 NOV 63
APPROVAL
NASA APPROVAL W J Rhine 11-13-63
MIT APPROVAL 13 Nov 63

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TRANSISTOR, DUAL, NPN, SILICON, LOW STORAGE TIME

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010653
SCALE NONE	WT	SHEET 1 OF 2

INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

—	1010653

REVISIONS 04623			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04623	11-13-63	WK

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TABLE I

MANUFACTURER'S ABSOLUTE MAXIMUM RATINGS TC = +25°C

COLLECTOR VOLTAGE (V_{CB})	EMITTER VOLTAGE (V_{EB})	COLLECTOR VOLTAGE (V_{CE})	COLLECTOR POWER DISSIPATION	
V_{DC}	V_{DC}	V_{DC}	W	
40	5	15	.75 (.50 PER UNIT)	

TABLE II

ELECTRICAL CHARACTERISTICS AT TC = +25°C (UNLESS OTHERWISE SPECIFIED) PER SECTION

PARAMETER	CONDITION	SYMBOL	SPECIFICATION LIMITS MINIMUM	MAXIMUM	UNIT
STATIC FORWARD CURRENT TRANSFER RATIO	I_C=10mA, V_{CE}=1.0 V	h_{FE}	30	-	-
BASE SATURATION VOLTAGE	I_C=10 mA, I_B=1.0 mA	V_{BE}(SAT)	0.7	0.85	VOLTS
COLLECTOR SATURATION VOLTAGE	I_C=10 mA, I_B=1.0 mA	V_{CE}(SAT)	-	0.25	VOLTS
HIGH FREQUENCY CURRENT GAIN	I_C=20 mA, V_{CE}=10 V, f=100mc	h_{FE}	3.0	-	-
OUTPUT CAPACITANCE	I_E=0, V_{CB}=10 V, f=140kc	C_{ob}	-	6.0	pf
COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=20 V	I_{CBO}	-	25	nA
COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=20 V T_C=150°C	I_{CBO}	-	15	uA
COLLECTOR TO BASE BREAKDOWN VOLTAGE	I_C=1.0 uA, I_E=0	BV_{CBO}	40	-	VOLTS
SWITCHBACK VOLTAGE	I_C=30 mA(PULSED), I_B=0	LV_{CEO}	15	-	VOLTS
EMITTER TO BASE BREAKDOWN VOLTAGE	I_C=0, I_E=10 uA	BV_{EBO}	5.0	-	VOLTS
CHARGE STORAGE TIME CONSTANT(SEE FIG.1)	$I_C=I_{B1}=I_{B2}$=20 mA, PW>200 nsec	τ_s	—	25	nsec
COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=20V T_C=100°C	I_{CBO}		3	uA

CHARGE STORAGE TIME-CONSTANT TEST CIRCUIT

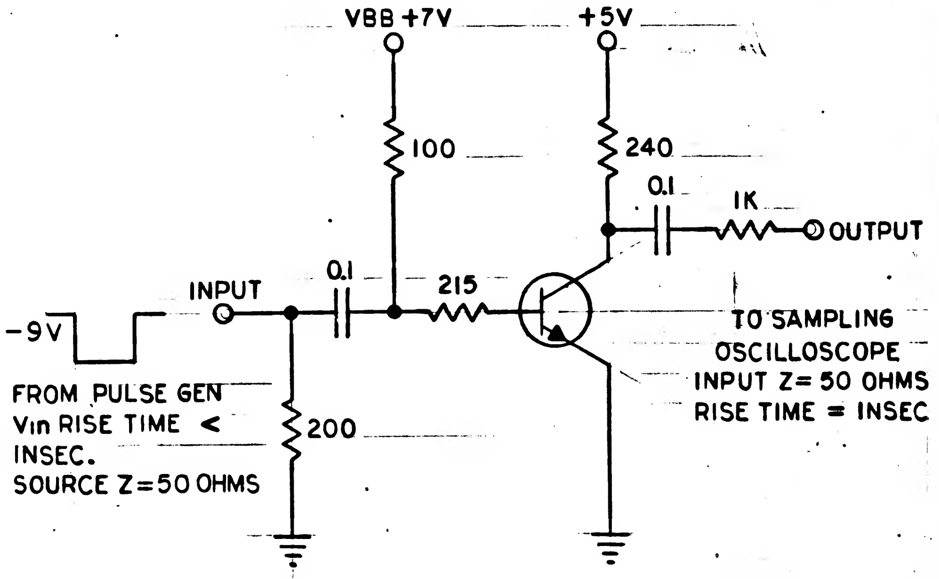


FIGURE I

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497

DRAWN Splane DATE 10 OCT 63
CHECKED 11 OCT 63
APPROVAL R. A. Test 12 NOV 63
APPROVAL
NASA APPROVAL W J Rhine 11-13-63
MIT APPROVAL 11 Nov 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR, DUAL, NPN, SILICON, LOW STORAGE TIME

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010653
SCALE NONE
WT
SHEET 2 OF 2

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

4 3 2 1

1010657 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05617	1/7/64	WK
A	REVISED PER TDRR 06194	5 Feb 64	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
   - C. EACH UNIT AND SHIPPING CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER, AND REVISION LETTER, DATE OF MANUFACTURE, LOT NUMBER AND EXPIRATION DATE FOR UNOPENED CONTAINERS.
2. INSPECTION AND ACCEPTANCE:
   - A. MATERIAL: THE MATERIAL SHALL BE A LIQUID EPOXY RESIN
   - B. PROPERTIES:
     - (1) CURE: THIS MATERIAL WHEN MIXED IN RATIOS FROM 100 PARTS BY WEIGHT 1010657 TO 100 PARTS BY WEIGHT 1010686 SHALL CURE TO A TACK FREE CONDITION IN A MINIMUM OF 16 HOURS AT A TEMPERATURE OF 25 ± 2°C.
     - (2) POT LIFE: A 50 GRAM QUANTITY OF MATERIAL CATALYZED AS IN B (1) SHALL BE USABLE THREE HOURS AFTER MIXING WHEN ALLOWED TO STAND AT 25 ± 2°C.
     - (3) COLOR: UNLESS OTHERWISE SPECIFIED THE COLOR OF THE UNCATALYZED MATERIAL SHALL BE CLEAR.
3. DESIGN
   - A. SHELF LIFE: THIS MATERIAL SHALL NOT BE USED AFTER ONE YEAR FROM THE DATE OF MANUFACTURE. MATERIAL SHALL HAVE AT LEAST EIGHT MONTHS USABLE SHELF LIFE WHEN RECIEVED BY THE USER.
   - B. INTENDED USE: THIS MATERIAL IS INTENDED FOR USE IN APPLICATIONS REQUIRING A 100% SOLIDS, HIGH STRENGTH, ROOM TEMPERATURE CURING ADHESIVE.
   - C. CURED MATERIAL PROPERTIES:
     - (1) DIELECTRIC STRENGTH: THIS MATERIAL SHALL HAVE A MINIMUM DIELECTRIC STRENGTH OF 325 VOLTS/MIL WHEN TESTED AS OUTLINED IN MIL-I-16923, PARAGRAPH 4.4.5. MATERIAL FOR THIS TEST SHALL BE MIXED IN A 1:1 WEIGHT RATIO WITH 1010686.
     - (2) SHEAR STRENGTH: THIS MATERIAL WHEN MIXED IN A RATIO OF 1:1 BY WEIGHT WITH 1010686, CURED FOR 16 HOURS AND APPLIED ON AN ALUMINUM SUBSTRATE SHALL EXHIBIT A MINIMUM SHEAR STRENGTH OF 2000 PSI WHEN TESTED AS OUTLINED IN ASTM-D-1002.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN I. PARKS DATE 27 NOV 63
CHECKED E. FOSTER 29 NOV 63
APPROVAL 1-7-64
APPROVAL
NASA APPROVAL
MIT APPROVAL 7 Jan 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

EPOXY RESIN

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010657
SCALE NONE
WT
SHEET 1 OF 1

1010657 A

PBR

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

— 1010657

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05617	1/7/64	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
   - C. EACH UNIT AND SHIPPING CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER, AND REVISION LETTER, DATE OF MANUFACTURE, LOT NUMBER AND EXPIRATION DATE FOR UNOPENED CONTAINERS.
2. INSPECTION AND ACCEPTANCE:
   - A. MATERIAL: THE MATERIAL SHALL BE A LIQUID EPOXY RESIN
   - B. PROPERTIES:
     - (1) CURE: THIS MATERIAL WHEN MIXED IN RATIOS FROM 100 PARTS BY WEIGHT 1010657 TO 100 PARTS BY WEIGHT 1010686 SHALL CURE TO A TACK FREE CONDITION IN A MINIMUM OF 16 HOURS AT A TEMPERATURE OF 22 ± 2°C.
     - (2) POT LIFE: A 50 GRAM QUANTITY OF MATERIAL CATALYZED AS IN B (1) SHALL BE USABLE THREE HOURS AFTER MIXING WHEN ALLOWED TO STAND AT 22 ± 2°C.
     - (3) COLOR: UNLESS OTHERWISE SPECIFIED THE COLOR OF THE UNCATALYZED MATERIAL SHALL BE CLEAR.
3. DESIGN
   - A. SHELF LIFE: THIS MATERIAL SHALL NOT BE USED AFTER ONE YEAR FROM THE DATE OF MANUFACTURE. MATERIAL SHALL HAVE AT LEAST EIGHT MONTHS USABLE SHELF LIFE WHEN RECIEVED BY THE USER.
   - B. INTENDED USE: THIS MATERIAL IS INTENDED FOR USE IN APPLICATIONS REQUIRING A 100% SOLIDS, HIGH STRENGTH, ROOM TEMPERATURE CURING ADHESIVE.
   - C. CURED MATERIAL PROPERTIES:
     - (1) DIELECTRIC STRENGTH: THIS MATERIAL SHALL HAVE A MINIMUM DIELECTRIC STRENGTH OF 325 VOLTS/MIL WHEN TESTED AS OUTLINED IN MIL-I-16923, PARAGRAPH 4.4.5. MATERIAL FOR THIS TEST SHALL BE MIXED IN A 1:1 WEIGHT RATIO WITH 1010686.
     - (2) SHEAR STRENGTH: THIS MATERIAL WHEN MIXED IN A RATIO OF 1:1 BY WEIGHT WITH 1010686, CURED FOR 16 HOURS AND APPLIED ON AN ALUMINUM SUBSTRATE SHALL EXHIBIT A MINIMUM SHEAR STRENGTH OF 2000 PSI WHEN TESTED AS OUTLINED IN ASTM-D-1002.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN J. PARKS DATE 27 NOV 63
CHECKED E. FOSTER 29 NOV 63
APPROVAL W. J. Sirois 1-7-64
APPROVAL
NASA APPROVAL
MIT APPROVAL W. Copper 7 Jan 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

EPOXY RESIN

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010657
SCALE NONE
WT
SHEET 1 OF 1

1010657 —

PBR

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

—	1010659

REVISIONS 05240

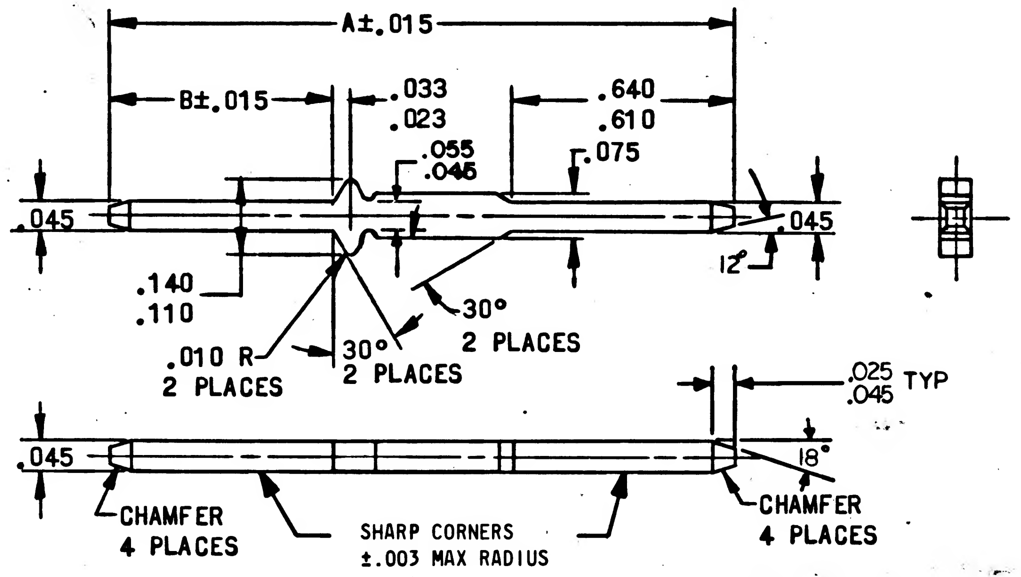
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05240		RPK wR

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: .044 STOCK HARD BRASS PER QQ-B-613.
     - (2) FINISH: GOLD PLATING .000050 MIN. PER MIL-G-45204, TYPE II OVER SILVER PLATE PER QQ-S-365, .0002 MIN. THICKNESS.
     - (3) WORKMANSHIP: UNITS SHALL BE UNIFORM IN QUALITY, CLEAN, SOUND, SMOOTH, AND FREE FROM PITS, SCRATCHES, SLIVERS, LAPS, CRACKS, SCALE, DAMAGED ENDS OR EDGES AND ANY OTHER PHYSICAL DEFECTS.
     - (4) A CERTIFICATE OF COMPLIANCE WITH THE MATERIAL AND FINISH REQUIREMENTS SHALL ACCOMPANY EACH SHIPMENT.
     - (5) DIMENSIONS: IN TABLE AND IN PICTURE.
     - (6) MARKING:
       - (a) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME.
         - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER.
         - SUPPLIER'S LOT OR SERIAL NUMBER.
         - DATE CODE, OR DATE OF MANUFACTURE.
       - (b) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.



NASA PART NUMBER	A DIM.	B DIM.
1010659-1	1.212	.250
-2	1.337	.375
-3	1.430	.468
-4	1.462	.500
-5	1.587	.625

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.002 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS9-497

DRAWN WEISSERT DATE 21-OCT-63
CHECKED C Wilson 23 OCT 63
APPROVAL A. R. Test 16 DEC 63
APPROVAL
NASA APPROVAL 12/17/63
MIT APPROVAL 17 Dec 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL
DOUBLE ENDED
WRAPOST
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010659
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010663

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05322	20Dec63	WK

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL, INCULDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
   - C. EACH SHIPPING AND PACKAGING CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS, LOT NUMBER, DATE OF MANUFACTURE AND EXPIRATION DATE.
2. INSPECTION AND ACCEPTANCE:
   - A. MATERIAL SHALL BE A CLEAR EPOXY RESIN.
   - B. CURE SCHEDULE: TEST PER PARAGRAPH 3.
3. DESIGN REQUIREMENTS:
   - A. CURED MATERIAL: WHEN MIXED IN THE RATIO OF 100 PARTS RESIN (1010663), 20 PARTS CURING AGENT (1010681) AND 6 PARTS CATALYST (1010304) BY WT., AND CURED FOR ONE HOUR MINIMUM AT 75° ±5°F AND THREE HOURS AT 150° ±5°F, A CLEAR TACK FREE MATERIAL SHALL RESULT.
   - B. PHYSICAL PROPERTIES: CURED MATERIAL SHALL BE CAPABLE OF MEETING THE FOLLOWING CHARACTERISTICS WHEN COMBINED IN THE RATIOS SPECIFIED IN 3.A. AND CURED FOR 1 HOUR MINIMUM AT 75° ±5°F AND THEN 16 HOURS ±1 HOUR AT 150° ± 5°F MINIMUM.
     - (1) ADHESION: A 1" WIDE BY 1/2" LONG LAP SHEAR JOINT OF POLYCARBONATE PLASTIC BONDED WITH THIS MATERIAL SHALL EXHIBIT A SHEAR STRENGTH OF 20 PSI MINIMUM.
     - (2) SHRINKAGE: WHEN TESTED IN ACCORDANCE WITH ASTM-D-551, THE SHRINKAGE SHALL BE A MAXIMUM OF .005 INCHES PER INCH.
     - (3) POT LIFE: THE POT LIFE OF 60 GRAMS OF MATERIAL MIXED PER ND 1002106 SHALL BE A MINIMUM OF 1 AND 1/2 HOURS.
     - (4) CURE SCHEDULE: THE MIXED MATERIALL SHALL BE CAPABLE OF BEING CURED IN 3 HOURS AT 150°F WITH A MINIMUM SHORE D HARDNESS OF 70 AT ROOM TEMPERATURE.
     - (5) CORROSIVITY: THE MATERIAL WHEN CURED IN PLACE ON POLISHED COPPER SHALL PRODUCE NO EVIDENCE OF CORROSION AS EVIDENCED BY DISCOLORATION OR PITTING.
     - (6) HEAT DISTORTION TEMPERATURE: THE HEAT DISTORTION TEMPERATURE SHALL BE A MINIMUM OF 135°F WHEN TESTED AS OUTLINED IN ASTM-D-648 USING AN OUTER FIBER STRESS OF 66 PSI.
     - (7) WATER ABSORPTION: A SAMPLE OF THE CURED MATERIAL 1/4 X 1 X 2 SHALL BE IMMERSED IN DISTILLED WATER AT ROOM TEMPERATURE FOR 48 HOURS. AT THE END OF THIS TIME PERIOD, THERE SHALL BE A MAXIMUM OF 1% WEIGHT GAIN.
     - (8) DENSITY: DENSITY OF THE CURED MATERIAL SHALL BE 1.1 ± .1 GRAMS/CM^3 WHEN TESTED AS SPECIFIED IN LP 406 METHOD 5012.
     - (9) THERMAL CYCLING: A SAMPLE OF THE CURED MATERIAL 4" IN DIAMETER AND 1/8" THICK SHALL SHOW NO CRACKING OR DISTORTION WHEN SUBJECTED TO 10 CYCLES OF -67F FOR 1/2 HOUR AND THEN 130°F FOR 1/2 HOUR. ALL CYCLES SHALL BE PERFORMED IN AIR.
     - (10) DIELECTRIC STRENGTH: WHEN TESTED AS OUTLINED IN MIL-I-16923, THE DIELECTRIC STRENGTH SHALL BE A MINIMUM OF 275 VOLTS PER MIL.
     - (11) VOLUME RESISTIVITY: THE VOLUME RESISTIVITY OF THIS MATERIAL SHALL BE A MINIMUM OF 10^{12} OHM CENTIMETERS WHEN TESTED AS OUTLINED IN MIL-I-16923.
     - (12) SHELF LIFE: SIX (6) MONTHS. MATERIAL SHALL HAVE A LEAST 4 MONTHS USABLE SHELF LIFE WHEN RECEIVED AND STORED AT ROOM AMBIENT CONDITIONS IN UNOPENED CONTAINERS.

PROCURE ONLY FROM APPROVED SOURCE LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Patterson DATE 20OCT63
CHECKED A. Martz 12-20-63
APPROVAL D. R. Tut 12-20-63
APPROVAL
NASA APPROVAL W. J. Rhine 12-20-63
MIT APPROVAL W Kupfer 20Dec63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ENCAPSULANT
EPOXY RESIN, CLEAR

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010663
SCALE
WT
SHEET OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010663

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010665 A

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 03699		
A	REVISED PER TDRR 10042	4/6/64	wl.

REQUIREMENTS:

1. **GENERAL:**
   - A. **INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.**
   - B. **SUPPLIER PROCESS AND QUALITY CONTROL INCLUDING FINAL TESTING SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.**
   - C. **EACH CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, DATE OF MANUFACTURE,** STABILITY EXPIRATION DATE **AND NET CONTENTS**, PER MIL-STD-129.
2. **ACCEPTANCE AND INSPECTION REQUIREMENTS:**
   - A. **MATERIAL:** POLYTETRAFLUOROETHYLENE DISPERSION IN WATER.
   - B. **COLOR: CLEAR**
   - C. **SOLIDS CONTENT (PERCENT BY WEIGHT): 48 ± 1% WHEN TESTED IN ACCORDANCE WITH METHOD 4041, FED. TEST METHOD STANDARD NO. 141, EXCEPT THE HEAT CYCLE SHALL BE 105°C ±2°C (221° ± 3.6°F) FOR ONE HOUR FOLLOWED BY 399° ± 10°C (750° ± 18°F) FOR 10 MINUTES.**
   - D. **WEIGHT (LB/GAL): 11.0 ±** 0.25 **WHEN TESTED IN ACCORDANCE WITH FED. TEST METHOD STANDARD NO. 141, METHOD 4184.**
   - E. **AVAILABILITY: THE MATERIAL SHALL BE FURNISHED IN PINT, QUART OR GALLON CONTAINERS AS SPECIFIED IN THE CONTRACT OR PURCHASE ORDER.**
3. **DESIGN REQUIREMENTS:**

   APPLICATION: ND [illegible]
   - A. **STORAGE: STORE AT ROOM TEMPERATURE, 75° ± 5°F. TO PREVENT LOSS FROM SETTLING, CONTAINERS ARE TO BE AGITATED EACH MONTH WHILE IN STORAGE.**
   - B. **SHELF LIFE: 1 YEAR** [illegible] ± 5°F.
   - C. **INTENDED USE: THIS MATERIAL IS INTENDED FOR USE AS A CORROSION PREVENTATIVE COATING AND AS A DIELECTRIC FILM ON METAL SUBSTRATES.**

PROCURE ONLY FROM APPROVED SOURCE LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER

MX 112102

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS

DRAWN D. Malloy DATE [illegible]
CHECKED C. Prado 3 SEP 63
APPROVAL
APPROVAL F. J. Sroca 10-3-63
NASA APPROVAL W. J. Rhine 10-8-63
MIT APPROVAL W. Kupfer 8 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TFE-FLUOROCARBON RESIN FINISH

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010665
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 03699		
A	REVISED PER TDRR 10042	6/8/64	WR
B	REVISED PER TDRR 11940	2 Aug 64	WR

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. **GENERAL:**
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL INCLUDING FINAL TESTING SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
   - C. EACH CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA DRAWING NUMBER, REV LETTER, ITEM NAME, DATE OF MANUFACTURE AND NET CONTENTS.
2. **ACCEPTANCE AND INSPECTION REQUIREMENTS:**
   - A. **MATERIAL:** POLYTETRAFLUOROETHYLENE DISPERSION IN WATER.
   - B. **COLOR:** CLEAR
   - C. **SOLIDS CONTENT (PERCENT BY WEIGHT):** 48 ± 1% WHEN TESTED IN ACCORDANCE WITH METHOD 4041, FED. TEST METHOD STANDARD NO. 141, EXCEPT THE HEAT CYCLE SHALL BE 105°C ±2°C (221° ± 3.6°F) FOR ONE HOUR FOLLOWED BY 399° ± 10°C (750° ± 18°F) FOR 10 MINUTES.
   - D. **WEIGHT (LB/GAL):** 11.0 ± 0.25 WHEN TESTED IN ACCORDANCE WITH FED. TEST METHOD STANDARD NO. 141, METHOD 4184.
   - E. **AVAILABILITY:** THE MATERIAL SHALL BE FURNISHED IN PINT, QUART OR GALLON CONTAINERS AS SPECIFIED IN THE CONTRACT OR PURCHASE ORDER.
3. **DESIGN REQUIREMENTS:**
   - A. **STORAGE:** STORE AT ROOM TEMPERATURE, 75° ± 5°F. TO PREVENT LOSS FROM SETTLING, CONTAINERS ARE TO BE AGITATED EACH MONTH WHILE IN STORAGE.
   - B. **SHELF LIFE:** 1 YEAR MINIMUM AT 75° ± 5°F.
   - C. **INTENDED USE:** THIS MATERIAL IS INTENDED FOR USE AS A CORROSION PREVENTATIVE COATING AND AS A DIELECTRIC FILM ON METAL SUBSTRATES.

PROCURE ONLY FROM APPROVED SOURCE LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER

MX 112102

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN D. Malloy DATE 29 Aug 63
CHECKED C. Pizzola 3 SEP 63
APPROVAL
APPROVAL F. J. Sovaco 10-3-63
NASA APPROVAL W. J. Rhine 10-8-63
MIT APPROVAL W Kupfer 8 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TFE-FLUOROCARBON RESIN FINISH

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010665
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010665 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER. AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 03699		
A	REVISED PER TDRR 10042	6/4/64	[illegible]
B	REVISED PER TDRR 11940	[illegible]	[illegible]
C	REVISED PER TDRR 29829	8 JULY 66	JAC

REQUIREMENTS:

1. **GENERAL:**
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL INCLUDING FINAL TESTING SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
   - C. EACH CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA DRAWING NUMBER, REV LETTER, ITEM NAME, DATE OF MANUFACTURE AND NET CONTENTS
2. **ACCEPTANCE AND INSPECTION REQUIREMENTS:**
   - A. MATERIAL: POLYTETRAFLUOROETHYLENE DISPERSION IN WATER.
   - B. COLOR: CLEAR
   - C. SOLIDS CONTENT (PERCENT BY WEIGHT): 48 ± 1.25% WHEN TESTED IN ACCORDANCE WITH METHOD 4041, FED. TEST METHOD STANDARD NO. 141, EXCEPT THE HEAT CYCLE SHALL BE 105°C ±2°C (221° ± 3.6°F) FOR ONE HOUR FOLLOWED BY 399° ± 10°C (750° ± 18°F) FOR 10 MINUTES.
   - D. WEIGHT (LB/GAL): 11.0 ± 0.25 WHEN TESTED IN ACCORDANCE WITH FED. TEST METHOD STANDARD NO. 141, METHOD 4184.
   - E. AVAILABILITY: THE MATERIAL SHALL BE FURNISHED IN PINT, QUART OR GALLON CONTAINERS AS SPECIFIED IN THE CONTRACT OR PURCHASE ORDER.
3. **DESIGN REQUIREMENTS:**
   - A. STORAGE: STORE AT ROOM TEMPERATURE, 75° ± 5°F. TO PREVENT LOSS FROM SETTLING, CONTAINERS ARE TO BE AGITATED EACH MONTH WHILE IN STORAGE.
   - B. SHELF LIFE: 1 YEAR MINIMUM AT 75° ± 5°F.
   - C. INTENDED USE: THIS MATERIAL IS INTENDED FOR USE AS A CORROSION PREVENTATIVE COATING AND AS A DIELECTRIC FILM ON METAL SUBSTRATES.
   - D. SUPPLIER: E. I. DUPONT DE NEMOURS & CO.
     INDUSTRIAL FINISHES DEPT.
     WYNNEWOOD, PA.

   SUPPLIER DESIGNATION: 1851-204 TFE

PROCURE ONLY FROM APPROVED SOURCE LISTED IN ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS 9-497
DRAWN D. Matley DATE 29AUG63
CHECKED C Pizola 3SEP63
APPROVAL
APPROVAL F.J. Sirocco 10-3-63
NASA APPROVAL W J Rhine 10-8-63
MIT APPROVAL [illegible] 8Oct63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TFE-FLUOROCARBON RESIN FINISH

SOURCE CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010665
SCALE NONE
WT
SHEET 1 OF 1

1010665 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010665

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 03699		

REQUIREMENTS:

1. **GENERAL:**
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL INCLUDING FINAL TESTING SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
   - C. EACH CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, DATE OF MANUFACTURE, STABILITY EXPIRATION DATE AND NET CONTENTS.
2. **ACCEPTANCE AND INSPECTION REQUIREMENTS:**
   - A. MATERIAL: TETRAFLUOROETHYLENE DISPERSION IN WATER.
   - B. COLOR: CLEAR
   - C. SOLIDS CONTENT (PERCENT BY WEIGHT): 48 ± 1% WHEN TESTED IN ACCORDANCE WITH METHOD 4041, FED. TEST METHOD STANDARD NO. 141, EXCEPT THE HEAT CYCLE SHALL BE 105°C ±2°C (221° ± 3.6°F) FOR ONE HOUR FOLLOWED BY 399° ± 10°C (750° ± 18°F) FOR 10 MINUTES.
   - D. WEIGHT (LB/GAL): 11.0 ± 0.1 WHEN TESTED IN ACCORDANCE WITH FED. TEST METHOD STANDARD NO. 141, METHOD 4184.
   - E. AVAILABILITY: THE MATERIAL SHALL BE FURNISHED IN PINT, QUART OR GALLON CONTAINERS AS SPECIFIED IN THE CONTRACT OR PURCHASE ORDER.
3. **DESIGN REQUIREMENTS:**
   - A. APPLICATION: ND 1002067
   - B. STORAGE: STORE AT ROOM TEMPERATURE, 75° ± 5°F. TO PREVENT LOSS FROM SETTLING, CONTAINERS ARE TO BE AGITATED EACH MONTH WHILE IN STORAGE.
   - C. SHELF LIFE: 1 YEAR MINIMUM AT 75° ± 5°F.
   - D. INTENDED USE: THIS MATERIAL IS INTENDED FOR USE AS A CORROSION PREVENTATIVE COATING AND AS A DIELECTRIC FILM ON METAL SUBSTRATES.

PROCURE ONLY FROM APPROVED SOURCE LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER

MX 112102

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATEPIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497

DRAWN D. Motley DATE 29AUG63
CHECKED C. Piozda 3SEP63
APPROVAL
APPROVAL F.J. Sroco 10-3-63
NASA APPROVAL W. J. Rhine 10-8-63
MIT APPROVAL W Kupfer 8Oct63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TFE-FLUOROCARBON RESIN FINISH

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010665
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010665

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

A 9990101

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
–	INITIAL RELEASE CLASS A PER TDRR 03699		
A	REVISED PER TDRR 18989	6/2/65	WR

REQUIREMENTS

1. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

B. EACH CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, DATE OF MANUFACTURE, AND NET CONTENTS.

2. ACCEPTANCE AND INSPECTION REQUIREMENTS:

A. MATERIAL - THE MATERIAL SHALL BE AN AQUEOUS DISPERSION OF POLYTETRAFLUOROETHYLENE CONTAINING AN INERT COLORING AGENT AND OTHER PROPRIETARY INGREDIENTS AND SHALL BE SUITABLE FOR USE AS A ONE-COAT FINISH ON METAL SUBSTRATES OR AS A PRIMER FOR OTHER TFE OR FEP FLUOROCARBON RESIN FINISHES.

B. COLOR - GREEN.

C. SOLIDS CONTENT (PERCENT BY WEIGHT) - 48 ± 1% WHEN TESTED IN ACCORDANCE WITH METHOD 4041, FED. TEST METHOD. STANDARD NO. 141, EXCEPT THE HEAT CYCLE SHALL BE 105° ± 2°C (221° ± 3.6°F) FOR ONE HOUR FOLLOWED BY 399° ± 10°C (750° ± 18°F) FOR 10 MINUTES.

D. WEIGHT (LB/GAL) - 11.8 ± 0.25 WHEN TESTED IN ACCORDANCE WITH FED. TEST METHOD STANDARD NO. 141, METHOD 4184.

E. AVAILABILITY - THE MATERIAL SHALL BE FURNISHED IN PINT, QUART OR GALLON CONTAINERS AS SPECIFIED IN THE CONTRACT OR PURCHASE ORDER.

3. DESIGN REQUIREMENTS:

A. STORAGE - STORE AT 40° ± 5°F.
TO PREVENT LOSS FROM SETTLING, CONTAINERS ARE TO BE AGITATED ONCE EACH MONTH WHILE IN STORAGE. PRESSURE BUILDUP MAY OCCUR, VENT CONTAINERS ONCE EACH MONTH TO AVOID BUILDUP.

B. SHELF LIFE - THE MATERIAL SHALL HAVE NOT LESS THAN 9 MONTHS USABLE SHELF LIFE WHEN RECEIVED BY THE PURCHASER AND STORED AT A TEMPERATURE OF 40° ± 5°F, OR NOT LESS THAN 1 MONTH WHEN STORED AT 75° ± 5°F.

C. APPLICATION DATA: THIS MATERIAL REQUIRES FUSING TEMPERATURE ABOVE 725°F AND CANNOT BE USED ON SUBSTRATES/PARTS WHICH CANNOT WITHSTAND HIGH TEMPERATURE MINUTE QUANTITIES OF HIGHLY TOXIC GASES ARE RELEASED AT 600°F AND ABOVE DURING FUSING.

D. ONLY THE ITEM LISTED ON THIS DRAWING AND IDENTIFIED BY VENDOR'S NAME, ADDRESS, AND PART NUMBER, HAVE BEEN TESTED AND APPROVED BY MIT INSTRUMENTATION LAB. A SUBSTITUTE ITEM SHALL NOT BE USED WITHOUT PRIOR TESTING AND APPROVAL BY MIT INSTRUMENTATION LAB.

SUPPLIER: E.I. DUPONT DENEMOURS & CO.
INDUSTRIAL FINISHES DEPT.
WILMINGTON, DELAWARE

SUPPLIER DESIGNATION: 851-204 TFE -
FLUOROCARBON RESIN ONE-COAT GREEN ENAMEL.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

MASTER

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ± —— ANGLES ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497

DRAWN D. Matley DATE 29 AUG 63
CHECKED 30 AUG 63
APPROVAL
APPROVAL 10-3-63
NASA APPROVAL W. J. Rhine 10-8-63
MIT APPROVAL 8 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TFE-FLUOROCARBON ONE-COAT
GREEN ENAMEL

SOURCE CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010666
SCALE NONE
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAT BE RELATED THERETO.

B 9990101

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
–	INITIAL RELEASE CLASS A PER TDRR 03699		
A	REVISED PER TDRR 18989	6/2/65	WK
B	REVISED PER TDRR 29260	6-14-66	

REQUIREMENTS

1. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

B. EACH CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, DATE OF MANUFACTURE, AND NET CONTENTS.

2. ACCEPTANCE AND INSPECTION REQUIREMENTS:

A. MATERIAL - THE MATERIAL SHALL BE AN AQUEOUS DISPERSION OF POLYTETRAFLUOROETHYLENE CONTAINING AN INERT COLORING AGENT AND OTHER PROPRIETARY INGREDIENTS AND SHALL BE SUITABLE FOR USE AS A ONE-COAT FINISH ON METAL SUBSTRATES OR AS A PRIMER FOR OTHER TFE OR FEP FLUOROCARBON RESIN FINISHES.

B. COLOR - GREEN.

C. SOLIDS CONTENT (PERCENT BY WEIGHT) - 48 ± 5% WHEN TESTED IN ACCORDANCE WITH METHOD 4041, FED. TEST METHOD. STANDARD NO. 141, EXCEPT THE HEAT CYCLE SHALL BE 105° ± 2°C (221° ± 3.6°F) FOR ONE HOUR FOLLOWED BY 399° ± 10°C (750° ± 18°F) FOR 10 MINUTES.

D. WEIGHT (LB/GAL) - 11.8 ± .6 WHEN TESTED IN ACCORDANCE WITH FED. TEST METHOD STANDARD NO. 141, METHOD 4184.

E. AVAILABILITY - THE MATERIAL SHALL BE FURNISHED IN PINT, QUART OR GALLON CONTAINERS AS SPECIFIED IN THE CONTRACT OR PURCHASE ORDER.

3. DESIGN REQUIREMENTS:

A: STORAGE - STORE AT 40° ± 5°F. TO PREVENT LOSS FROM SETTLING, CONTAINERS ARE TO BE AGITATED ONCE EACH MONTH WHILE IN STORAGE. PRESSURE BUILDUP MAY OCCUR, VENT CONTAINERS ONCE EACH MONTH TO AVOID BUILDUP. WHEN MATERIAL IS TO BE AGITATED IT MUST BE BROUGHT UP TO ROOM TEMPERATURE BEFORE AGITATION OR THE MATERIAL WILL COAGUALATE.

B. SHELF LIFE - THE MATERIAL SHALL HAVE NOT LESS THAN 10 MONTHS USABLE SHELF LIFE WHEN RECEIVED BY THE PURCHASER AND STORED AT A TEMPERATURE OF 40° ± 5°F, OR NOT LESS THAN 1 MONTH WHEN STORED AT 75° ± 5°F.

C. APPLICATION DATA: THIS MATERIAL REQUIRES FUSING TEMPERATURE ABOVE 725°F AND CANNOT BE USED ON SUBSTRATES/PARTS WHICH CANNOT WITHSTAND HIGH TEMPERATURE MINUTE QUANTITIES OF HIGHLY TOXIC GASES ARE RELEASED AT 600°F AND ABOVE DURING FUSING.

D. ONLY THE ITEM LISTED ON THIS DRAWING AND IDENTIFIED BY VENDOR'S NAME, ADDRESS, AND PART NUMBER, HAVE BEEN TESTED AND APPROVED BY MIT INSTRUMENTATION LAB. A SUBSTITUTE ITEM SHALL NOT BE USED WITHOUT PRIOR TESTING AND APPROVAL BY MIT INSTRUMENTATION LAB.

SUPPLIER: E.I. DUPONT DENEMOURS & CO.
INDUSTRIAL FINISHES DEPT.
WILMINGTON, DELAWARE

SUPPLIER DESIGNATION: 851-204 TFE -
FLUOROCARBON RESIN ONE-COAT GREEN ENAMEL.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN D. Matley DATE 29 AUG 63
CHECKED W. Duell 30 AUG 63
APPROVAL
APPROVAL E.J. Sisco 10-3-63
NASA APPROVAL W. J. Rhine 10-8-63
MIT APPROVAL W. Kupfer 8 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TFE-FLUOROCARBON ONE-COAT GREEN ENAMEL

SOURCE CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010666
SCALE NONE
WT
SHEET 1 OF 1

1010666 B

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

9990101

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
–	INITIAL RELEASE CLASS A PER TDRR 03699		

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL INCLUDING FINAL TESTING SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
   - C. EACH CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, DATE OF MANUFACTURE, STABILITY EXPIRATION DATE AND NET CONTENTS.

2. ACCEPTANCE AND INSPECTION REQUIREMENTS:
   - A. MATERIAL - TETRAFLUOROETHYLENE DISPERSION IN WATER.
   - B. COLOR - GREEN.
   - C. SOLIDS CONTENT (PERCENT BY WEIGHT) - 48 ± 1% WHEN TESTED IN ACCORDANCE WITH METHOD 4041, FED. TEST METHOD. STANDARD NO. 141, EXCEPT THE HEAT CYCLE SHALL BE 105° ± 2°C (221° ± 3.6°F) FOR ONE HOUR FOLLOWED BY 399° ± 10°C (750° ± 18°F) FOR 10 MINUTES.
   - D. WEIGHT (LB/GAL) - 11.8 ± 0.1 WHEN TESTED IN ACCORDANCE WITH FED. TEST METHOD STANDARD NO. 141, METHOD 4184.
   - E. AVAILABILITY - THE MATERIAL SHALL BE FURNISHED IN PINT, QUART OR GALLON CONTAINERS AS SPECIFIED IN THE CONTRACT OR PURCHASE ORDER.

3. DESIGN REQUIREMENTS:
   - A. APPLICATION - ND-1002067
   - B. STORAGE - STORE AT 40° ± 5°F.
     TO PREVENT LOSS FROM SETTLING, CONTAINERS ARE TO BE AGITATED ONCE EACH MONTH WHILE IN STORAGE. PRESSURE BUILDUP MAY OCCUR, VENT CONTAINERS ONCE EACH MONTH TO AVOID BUILDUP.
   - C. SHELF LIFE - 10 MONTHS MINIMUM AT 40° ± 5°F OR 1 MONTH AT 75 ± 5°F.
   - D. INTENDED USE - THIS MATERIAL IS INTENDED FOR USE AS A PRIMER IN APPLICATION OF TEFLON FINISHES.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN D. Matley DATE 29 AUG 63
CHECKED W. Dietl 30 AUG 63
APPROVAL
APPROVAL Y. J. Siaco 10-3-63
NASA APPROVAL W. J. Rhine 10-8-63
MIT APPROVAL W Kupfer 8 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TEFLON PRIMER

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010666
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010667 A

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 03699		
A	REVISED PER TDRR 17934	4/27/65	WR

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

B. EACH CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NET CONTENTS, AND DATE OF MANUFACTURE.

2. ACCEPTANCE AND INSPECTION REQUIREMENTS:

A. MATERIAL: THE MATERIAL SHALL BE AN AQUEOUS DISPERSION OF A FLUORINATED ETHYLENEPROPYLENE COPOLYMER.

B. COLOR: (FUSED) - CLEAR

C. SOLIDS CONTENT (PERCENT BY WEIGHT): 45 ± 2% WHEN TESTED IN ACCORDANCE WITH METHOD 4041, FED. TEST METHOD STANDARD NO. 141, EXCEPT THE HEAT CYCLE SHALL BE 105° ± 2°C (221 ± 3.6°F) FOR ONE HOUR FOLLOWED BY 399° ± 10°C (750° ± 18°F) FOR 10 MINUTES.

D. WEIGHT (LBS/GAL): 11.15 ± 0.25 WHEN TESTED IN ACCORDANCE WITH FED. TEST METHOD STANDARD 141, METHOD 4184.

E. AVAILABILITY: THE MATERIAL SHALL BE FURNISHED IN PINT, QUART OR GALLON CONTAINERS AS SPECIFIED IN THE CONTRACT OR PURCHASE ORDER.

3. DESIGN REQUIREMENTS:

A. SHELF LIFE: THE MATERIAL SHALL HAVE NOT LESS THAN 9 MONTHS USABLE SHELF LIFE WHEN RECEIVED BY THE PURCHASER AND STORED AT A TEMPERATURE OF 40° TO 80°F, IN CLOSED CONTAINERS.

B. STORAGE: STORE AT TEMPERATURE BETWEEN 40°F TO 80°F TO PREVENT LOSS FROM SETTLING. CONTAINERS ARE TO BE AGITATED ONCE PER MONTH AFTER THE THIRD MONTH FROM DATE OF MANUFACTURE.

C. APPLICATION DATA: THIS MATERIAL REQUIRES FUSING TEMPERATURE ABOVE 575°F AND CANNOT BE USED ON SUBSTRATES/PARTS WHICH CANNOT WITHSTAND HIGH TEMPERATURES. MINUTE QUANTITIES OF HIGHLY TOXIC GASES ARE RELEASED AT 600°F AND ABOVE AND DURING FUSING.

D. SUPPLIER:
E.I. DUPONT DE NEMOURS & CO.
INDUSTRIAL FINISHES DEPT.
WILMINGTON, DELAWARE

SUPPLIER DESIGNATION: 856-200 FEP
FLUORO CARBON RESIN FINISH

E. ONLY THE ITEM LISTED ON THIS DRAWING AND IDENTIFIED BY VENDORS NAME, ADDRESS, AND PART NUMBER, HAVE BEEN TESTED AND APPROVED BY MIT INSTRUMENTATION LAB. FOR USE IN APOLLO CDU & IMU. A SUBSTITUTE ITEM SHALL NOT BE USED WITHOUT PRIOR TESTING AND APPROVAL BY MIT INSTRUMENTATION LAB.

MX112103

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NA9 9-497

DRAWN D. Mattey DATE 29[illegible]63
CHECKED A. Marts 10-1-63
APPROVAL
APPROVAL F.J. Sivaco 10-3-63
NASA APPROVAL W.J. Rhine 10-8-63
MIT APPROVAL W. Kupfer 8 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FEP - FLUOROCARBON RESIN FINISH

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010667
SCALE NONE
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
–	INITIAL RELEASE CLASS A PER TDRR 03699		

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
   - C. EACH CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NET CONTENTS, DATE OF MANUFACTURE AND STABILITY EXPIRATION DATE.
2. ACCEPTANCE AND INSPECTION REQUIREMENTS:
   - A. MATERIAL: FLUORINATED ETHYLENE-PROPYLENE DISPERSION IN WATER.
   - B. COLOR: (FUSED) - CLEAR
   - C. SOLIDS CONTENT (PERCENT BY WEIGHT): 45 ± 2% WHEN TESTED IN ACCORDANCE WITH METHOD 4041, FED. TEST METHOD STANDARD NO. 141, EXCEPT THE HEAT CYCLE SHALL BE 105° ± 2°C (221 ± 3.6°F) FOR ONE HOUR FOLLOWED BY 399° ± 10°C (750° ± 18°F) FOR 10 MINUTES.
   - D. WEIGHT (LBS/GAL): 11.15 ± 0.10 WHEN TESTED IN ACCORDANCE WITH FED. TEST METHOD STANDARD 141, METHOD 4184.
   - E. AVAILABILITY: THE MATERIAL SHALL BE FURNISHED IN PINT, QUART OR GALLON CONTAINERS AS SPECIFIED IN THE CONTRACT OR PURCHASE ORDER.
3. DESIGN REQUIREMENTS:
   - A. APPLICATION: ND 1002067.
   - B. SHELF LIFE: 10 MONTHS MINIMUM AT 40° TO 80°F.
   - C. STORAGE: STORE AT TEMPERATURE BETWEEN 40°F TO 80°F TO PREVENT LOSS FROM SETTLING. CONTAINERS ARE TO BE AGITATED ONCE PER MONTH AFTER THE THIRD MONTH FROM DATE OF MANUFACTURE.
   - D. INTENDED USE: THIS MATERIAL IS INTENDED FOR USE AS A CORROSION PREVENTATIVE COATING AND AS A DIELECTRIC FILM ON METAL SUBSTRATES.

PROCURE ONLY FROM APPROVED SOURCE LISTED IN ND 1002034 FOR THIS DRAWING.

MX112103

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497

DRAWN D. Motteg DATE 29 ~~[illegible]~~ 63
CHECKED A. Marts 10-1-63
APPROVAL
APPROVAL J. J. Siraco 10-3-63
NASA APPROVAL W. J. Klein 10-8-63
MIT APPROVAL W. Kupfer 8 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FEP - FLUOROCARBON RESIN FINISH

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010667
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010667

SYM	REVISIONS DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 03699		

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
   - C. EACH CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NET CONTENTS, DATE OF MANUFACTURE AND STABILITY EXPIRATION DATE.
2. ACCEPTANCE AND INSPECTION REQUIREMENTS:
   - A. MATERIAL: FLUORINATED ETHYLENE-PROPYLENE DISPERSION IN WATER.
   - B. COLOR: (FUSED) - CLEAR
   - C. SOLIDS CONTENT (PERCENT BY WEIGHT): 45 ± 2% WHEN TESTED IN ACCORDANCE WITH METHOD 4041, FED. TEST METHOD STANDARD NO. 141, EXCEPT THE HEAT CYCLE SHALL BE 105° ± 2°C (221 ± 3.6°F) FOR ONE HOUR FOLLOWED BY 399° ± 10°C (75C° ± 18°F) FOR 10 MINUTES.
   - D. WEIGHT (LBS/GAL): 11.15 ± 0.10 WHEN TESTED IN ACCORDANCE WITH FED. TEST METHOD STANDARD 141, METHOD 4184.
   - E. AVAILABILITY: THE MATERIAL SHALL BE FURNISHED IN PINT, QUART OR GALLON CONTAINERS AS SPECIFIED IN THE CONTRACT OR PURCHASE ORDER.
3. DESIGN REQUIREMENTS:
   - A. APPLICATION: ND 1002067.
   - B. SHELF LIFE: 10 MONTHS MINIMUM AT 40° TO 80°F.
   - C. STORAGE: STORE AT TEMPERATURE BETWEEN 40°F TO 80°F TO PREVENT LOSS FROM SETTLING. CONTAINERS ARE TO BE AGITATED ONCE PER MONTH AFTER THE THIRD MONTH FROM DATE OF MANUFACTURE.
   - D. INTENDED USE: THIS MATERIAL IS INTENDED FOR USE AS A CORROSION PREVENTATIVE COATING AND AS A DIELECTRIC FILM ON METAL SUBSTRATES.

PROCURE ONLY FROM APPROVED SOURCE LISTED IN ND 1002034 FOR THIS DRAWING.

MX112103

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497

DRAWN D. Motley DATE 29AUG63
CHECKED A. Marto 10-1-63
APPROVAL
APPROVAL 10-3-63
NASA APPROVAL 10-8-63
MIT APPROVAL W Kupfer 8 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FEP - FLUOROCARBON RESIN FINISH

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010667
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

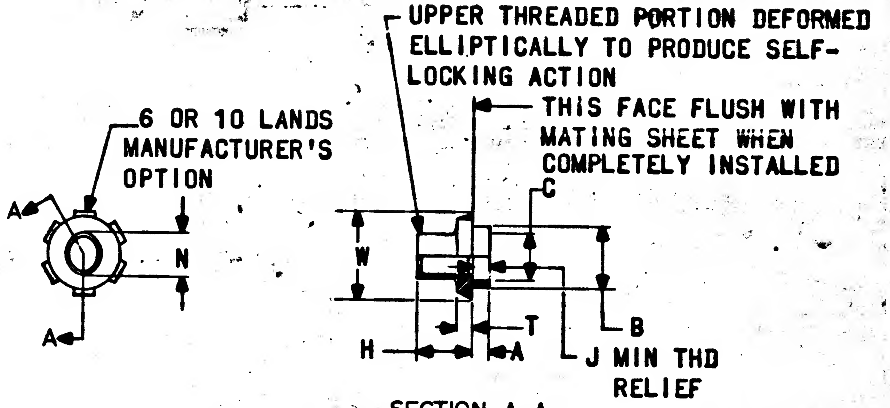
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05234		WL.
A	REVISED PER TDRR 09807	6/9/64	WL

05234

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. PERFORMANCE REQUIREMENTS: MIL-N-25027

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: A434 CORROSION RESISTANT STEEL, HEAT TREATED.
     - (2) FINISH: SILVER PLATED PER AMS 2410
     - (3) DIMENSIONS: AS SHOWN IN TABLE
     - (4) MARKING:
       - (a) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED PER MIL-STD-129 WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME.
         - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER.
         - DATE CODE, OR DATE OF MANUFACTURE.
       - (b) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.


UPPER THREADED PORTION DEFORMED ELLIPTICALLY TO PRODUCE SELF-LOCKING ACTION
THIS FACE FLUSH WITH MATING SHEET WHEN COMPLETELY INSTALLED
6 OR 10 LANDS MANUFACTURER'S OPTION
A
A
N
W
C
B
T
H
A
J MIN THD RELIEF

SECTION A-A

NASA PART NUMBER	THREAD SIZE	A	B	C	H MAX.	J MIN.	N REF.	T REF.	W MAX.	ENG. REF. INFO. RECOMMENDED HOLE DIAMETER
1010670-1	2-56 UNC-3B	.035/.025	.124/.114	.096/.086	.110	.030	.106	.030	.188	.125/.129
-2	4-40 UNC-3B	.035/.025	.155/.145	.122/.112	.124	.035	.135	.030	.219	.156/.160
-3	6-32 UNC-3B	.035/.025	.187/.177	.148/.138	.141	.035	.161	.030	.250	.188/.192
-4	8-32 UNC-3B	.040/.030	.218/.208	.174/.164	.160	.040	.200	.033	.281	.219/.223
-5	10-32 UNF-3B	.040/.030	.249/.239	.205/.109	.160	.040	.225	.033	.312	.250/.254

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG NO
CONTRACT NAS 9-497

DRAWN Bill Turner DATE 9 OCT 63
CHECKED Ed Foster 11 OCT 63
APPROVAL C. MAYO 10/10/63
APPROVAL
NASA APPROVAL 12/17/63
MIT APPROVAL 17 Dec 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

NUT - STAKE, MINIATURE

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	C	1010670
SCALE NONE	WT	SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

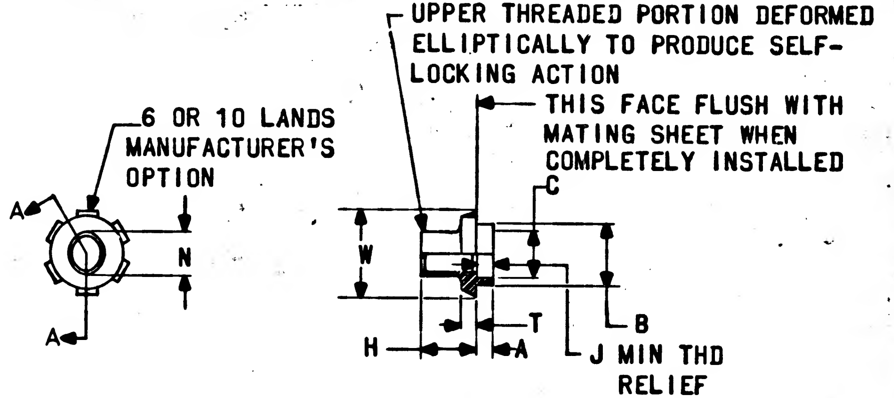
B 1010670

REVISIONS 05234			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05234		WK.
A	REVISED PER TDRR 09807	6/9/64	WK
B	REVISED PER TDRR 11839	15Aug64	WK.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. PERFORMANCE REQUIREMENTS: MIL-N-25027

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: CORROSION RESISTANT STEEL, HEAT TREATED PER AMS 5735E
     - (2) FINISH: SILVER PLATED PER AMS 2410
     - (3) DIMENSIONS: AS SHOWN IN TABLE
     - (4) MARKING:
       - (a) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED PER MIL-STD-129 WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME.
         - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER.
         - DATE CODE, OR DATE OF MANUFACTURE.
       - (b) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.


UPPER THREADED PORTION DEFORMED ELLIPTICALLY TO PRODUCE SELF-LOCKING ACTION
6 OR 10 LANDS MANUFACTURER'S OPTION
THIS FACE FLUSH WITH MATING SHEET WHEN COMPLETELY INSTALLED
A
A
N
W
C
T
B
H
A
J MIN THD RELIEF

SECTION A-A

NASA PART NUMBER	THREAD SIZE	A	B	C	H MAX.	J MIN.	N REF.	T REF.	W MAX.	ENG. REF. INFO. RECOMMENDED HOLE DIAMETER
1010670-1	2-56 UNC-3B	.035/.025	.124/.114	.096/.086	.110	.030	.106	.030	.188	.125/.129
-2	4-40 UNC-3B	.035/.025	.155/.145	.122/.112	.124	.035	.135	.030	.219	.156/.160
-3	6-32 UNC-3B	.035/.025	.187/.177	.148/.138	.141	.035	.161	.030	.250	.188/.192
-4	8-32 UNC-3B	.040/.030	.218/.208	.174/.164	.160	.040	.200	.033	.281	.219/.223
-5	10-32 UNF-3B	.040/.030	.249/.239	.205/.109	.160	.040	.225	.033	.312	.250/.254

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT NAS 9-497
DRAWN Rid Turner DATE 9 OCT 63
CHECKED Ed Foster 11 OCT 63
APPROVAL G. MAYO 10/10/63
APPROVAL
NASA APPROVAL 12/17/63
MIT APPROVAL 17 Dec 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

NUT - STAKE, MINIATURE

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. — SIZE C NASA DRAWING NO. 1010670
SCALE NONE WT SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

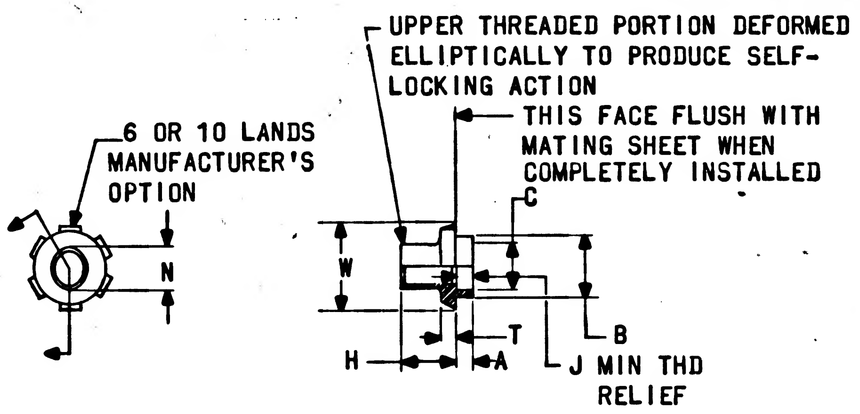
— 1010670

REVISIONS 05234			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05234		WK.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. PERFORMANCE REQUIREMENTS: MIL-N-25027

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: A286 CORROSION RESISTANT STEEL, HEAT TREATED
     - (2) FINISH: SILVER PLATED PER AMS 2410
     - (3) DIMENSIONS: AS SHOWN IN TABLE
     - (4) MARKING:
       - (a) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME.
         - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER.
         - DATE CODE, OR DATE OF MANUFACTURE.
       - (b) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.


UPPER THREADED PORTION DEFORMED ELLIPTICALLY TO PRODUCE SELF-LOCKING ACTION
THIS FACE FLUSH WITH MATING SHEET WHEN COMPLETELY INSTALLED
6 OR 10 LANDS MANUFACTURER'S OPTION
N
W
C
H
A
T
B
J MIN THD RELIEF

NASA PART NUMBER	THREAD SIZE	A	B	C	H MAX.	J MIN.	N REF.	T REF.	W MAX.	ENG. REF. INFO. RECOMMENDED HOLE DIAMETER
1010670-1	2-56 UNC-3B	.0359/.0306	.124/.114	.096/.086	.110	.030	.106	.030	.188	.125/.129
-2	4-40 UNC-3B	.0359/.0306	.155/.145	.122/.112	.124	.035	.135	.030	.219	.156/.160
-3	6-32 UNC-3B	.035/.030	.187/.177	.148/.138	.141	.035	.161	.030	.250	.188/.192
-4	8-32 UNC-3B	.040/.035	.218/.208	.174/.164	.160	.040	.200	.033	.281	.219/.223
-5	10-32 UNF-3B	.040/.035	.244/.239	.200/.190	.160	.040	.225	.033	.312	.250/.254

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO
CONTRACT NAS 9-497
DRAWN [illegible] DATE 9 OCT 63
CHECKED Ed Foster 11 OCT 63
APPROVAL G. MAYO 10/10/63
APPROVAL
NASA APPROVAL [illegible] 12/17/63
MIT APPROVAL [illegible] 17 Dec 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

NUT - STAKE, MINIATURE

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010670
SCALE NONE
WT
SHEET 1 OF 1

1010670

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 07584			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 07584	4/14/64	WL
A	REVISED PER TDRR 11686	2 Jun 64	WH

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. THESE CONNECTORS SHALL CONFORM TO THE REQUIREMENTS OF MIL-C-5015 (MS3106R28-20P) AND WITH THE PARTICULAR REQUIREMENTS LISTED BELOW.
   - C. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - D. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002052 UNLESS MODIFIED OR AMENDED BY THE INSPECTION AND ACCEPTANCE REQUIREMENTS LISTED BELOW.
   - E. CONTACTS SUPPLIED SEPARATELY IN A PLIOFILM BAG(PER L-P-00378) OR EQUIVALENT WITH 10% SPARES

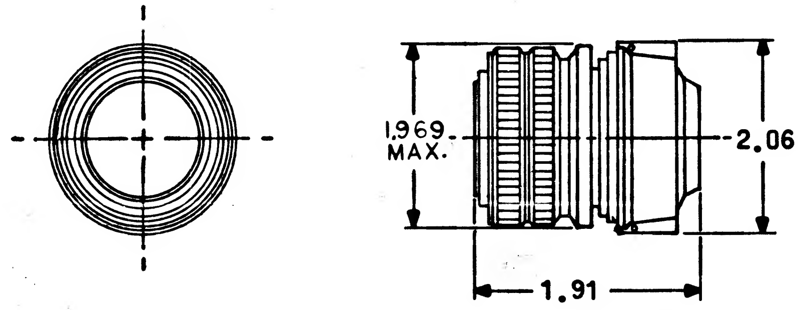
2. INSPECTION AND ACCEPTANCE:
   - A. ELECTRICAL REQUIREMENTS:
     - (1) ELECTRICAL CHARACTERISTICS (IN ACCORDANCE WITH THE MILITARY SPECIFICATIONS):
     - (2) DIELECTRIC WITHSTANDING VOLTAGE: PER TABLE 2
     - (3) INSULATION RESISTANCE: 5000 MEGOHMS MINIMUM (500 VDC)
   - B. MECHANICAL REQUIREMENTS:
     - (1) MARKING: UNITS SHALL BE PERMANENTLY AND LEGIBLY MARKED PER ND 1002019 , WITH THE NASA PART NUMBER AND REVISION LETTER, AND THE MANUFACTURER'S NAME AND/OR SYMBOL. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. EACH CONTAINER SHALL INCLUDE THE NASA DRAWING AND DASH NUMBER PLUS THE REVISION LETTER PER MIL-STD-129.
     - (2) SEALING PLUGS: UNLESS OTHERWISE SPECIFED, CONNECTORS CONTAINING CONTACT SIZES 16, 12, AND 8 SHALL BE SUPPLIED WITH PLUGS OF THE APPROPRIATE SIZE CONFORMING TO MS25251. THE NUMBER OF PLUGS SUPPLIED SHALL BE EQUAL TO OR GREATER THAN 15 PERCENT OF EACH OF THE TOTAL NUMBER OF SIZE 16, 12, AND 8 CONTACTS CONTAINED IN THE INSERT ARRANGEMENT.

3. DESIGN REQUIREMENTS:
   - A. OPERATING LIFE: SEE RELIABILITY NOTE
   - B. STORAGE LIFE: STORAGE - THE CONNECTOR DESIGN AND CONSTRUCTION SHALL BE SUCH THAT THE CONNECTORS SHALL MEET THE REQUIREMENTS HEREIN AFTER STORAGE FOR ONE YEAR WHEN PACKAGED AS SPECIFIED.

TABLE 8

NASA DASH NUMBER	NO. OF CONTACTS	INSERT ROTATION DEGREES
-1	10#12 AWG	0
-2	4#16 AWG	80

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.



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QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
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MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
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NASA APPROVAL W. S. [illegible] 4-14-64
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CONNECTOR PLUG, ELECTRICAL,
PIN CONTACTS CRIMP TERMINATION

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010671
SCALE NONE WT SHEET 1 OF 4

INCHES
0 1 2
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A 1010671

REVISIONS 07584			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 07584	4/14/64	WL
A	REVISED PER TDRR 11686	25 Sept 64	WL

REQUIREMENTS CONTINUED:

C. CONSTRUCTION:
- (1) TYPE CONNECTOR: ENVIRONMENT SEALED BY A GROMMET AND INSERT WITH A STRAIN RELIEF CLAMP, SOLID SHELL AND POSITIVE INSERT RETENTION.
- (2) TYPE CONTACT: CRIMP CONTACTS PER MS3193 (PINS) MIN OF 0.00003 INCH MIN GOLD PLATE PER MIL-G-45204 OVER 0.0003 INCH SILVER PLATE PER QQ-S-365.
- (3) NUMBER AND SIZE OF CONTACTS: SEE TABLE 8
  - (a) PERMEABILITY SHALL BE LESS THAN 2 MU.
- (4) COUPLING: THREADED COUPLING NUT.
- (5) SHELL: ALUMINUM ALLOY, PER QQ-A-591, FINISH PER MIL-F-14072, NUMBER E-516--ALUMILITE 225 (GRAY IN COLOR).
- (6) INSERT: RESILIENT MATERIAL PER MIL-R-3065 CLASS SC717A, B AND E.

D. RELIABILITY: CONNECTORS SHALL BE CAPABLE OF WITHSTANDING 500 CYCLES OF ENGAGEMENT AND DISENGAGEMENT WITHOUT ELECTRICAL OR MECHANICAL FAILURE.

E. ELECTRICAL:
- (1) INSULATION RESISTANCE (+125°C): 50 MEGOHMS MINIMUM (500 VDC)
- (2) CONTACT RESISTANCE: PER TABLE 6
- (3) CONTACT CURRENT RATING: NO. 16 AWG-22 AMPERES MAX, NO. 12 AWG-41 AMPERES MAXIMUM.
- (4) VOLTAGE RATING: 700 VDC AND 500 VRMS
- (5) INSERT ARRANGEMENT: PER MS33688-20
- (6) VIBRATION: METHOD I. A COMPLETE CONNECTOR ASSEMBLY SHALL BE MOUNTED AS REQUIRED AND VIBRATED IN ACCORDANCE WITH VIBRATION TEST, PROCEDURE I, OF SPECIFICATION MIL-E-5272. ALL CONTACTS SHALL BE WIRED WITH THE PROPER WIRE SIZE IN ACCORDANCE WITH SPECIFICATION MIL-W-5086. ONE PAIR OF EACH SIZE CONTACTS, REPRESENTATIVE OF THE CONTACTS USED, SHALL BE CONNECTED TO A SUITABLE TESTING CIRCUIT WITH AT LEAST 100 MILLIAMPERES FLOWING THROUGH THE CONTACTS. THE PLUG AND RECEPTACLES SHALL BE HELD TOGETHER ONLY BY THE LOCKING MEANS NORMALLY PROVIDED. THE CONNECTORS, WHEN TESTED SHALL NOT CRACK OR BREAK, AND THERE SHALL BE NO LOOSENING OF PARTS. RECEPTACLES SHALL RETAIN PLUGS IN FULL ENGAGEMENT DURING VIBRATION. THERE SHALL BE NO INTERRUPTION OF THE ELECTRICAL CONTINUITY LONGER THAN 10 MICROSECONDS.
- (7) PHYSICAL SHOCK: A MATED PLUG AND RECEPTACLE SHALL BE SUBJECTED TO A TRANSIENT DECELERATING FORCE PRODUCED BY SECURING THEM TO SUFFICIENT MASS, AND DROPPING THE ASSEMBLY THROUGH SUCH A HEIGHT THAT WHEN DECELERATED BY RESILIENT IMPACT, A DECELERATION OF 50 GRAVITY UNITS SHALL BE OBTAINED. THE PARTS OF THE CONNECTOR SHALL SHOW NO DAMAGE, AND THE CONTACTS SHALL MEET THE RESISTANCE OF CONTACTS TEST AS SPECIFIED IN TABLE 7 THE SHOCK TEST SHALL BE REPEATED IN EACH OF THE REFERENCED 90 DEGREE AXES POSITIONS. A SHOCK TESTING DEVICE IN ACCORDANCE WITH SPECIFICATION JAN-S-44, REVISED FOR CONNECTOR MOUNTING, IS A SATISFACTORY DEVICE FOR THIS TEST. THE CONNECTORS, DURING AND AFTER BEING TESTED SHALL SHOW NO SIGN OF DAMAGE.

TABLE 5

CONTACT ENGAGING AND SEPARATING FORCES

CONTACT SIZE	FORCE IN LBS.				
	AVERAGE	RANDOM PINS MAXIMUM	RANDOM PINS MINIMUM	STEEL PIN MINIMUM	STEEL PIN MAXIMUM
16	2.1	3	0.25	0.10	1.90
12	3.5	5	0.50	0.20	3.20

TABLE 6

CONTACT SIZE	TEST CURRENT (AMPS)	POTENTIAL DROP (MILLIVOLTS) (MAX)	POTENTIAL DROP AFTER CORROSION TEST (MILLIVOLTS) (MAX)
16	20	21	35
12	35	20	30

TABLE 7

CONTACT CRIMP TENSILE LOADS

CONTACT SIZE	WIRE GAUGE	CRIMP JOINT TENSILE LOAD (POUNDS) (MIN)
16	18	38
16	16	50
12	14	70
12	12	110

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CONNECTOR-PLUG, ELECTRICAL,
PIN CONTACTS CRIMP TERMINATION

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010671
SCALE WT SHEET 2 OF 4

INCHES
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REVISIONS 07584			
SYM	DESCRIPTION	DATE	APPROVAL
- -	INITIAL RELEASE CLASS A PER TDRR 07584	4/14/64	WRC
A	REVISED PER TDRR 11686	25 Jun 64	WRC

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REQUIREMENTS CONTINUED:

(8) HIGH POTENTIAL ALTITUDE: CONNECTORS SHALL BE TESTED IN A SUITABLE CHAMBER AT ROOM TEMPERATURE. THE CONNECTORS SHALL BE TESTED AT 10,000 FT. INTERVALS STARTING AT 10,000 FT. AND CONCLUDING AT 70,000 FT., AND SHALL BE TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301. THE APPLICABLE TEST VOLTAGE AS SHOWN IN FIGURE I SHALL BE APPLIED BETWEEN THE TWO CLOSEST CONTACTS AND BETWEEN THE SHELL AND THE CONTACT OR CONTACTS CLOSEST TO THE SHELL.

(a) HIGH POTENTIAL: CONNECTORS SHALL BE TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301. TEST VOLTAGES, AS SHOWN IN TABLE II SHALL BE APPLIED BETWEEN THE TWO CLOSEST CONTACTS AND BETWEEN THE SHELL AND THE CONTACT OR CONTACTS CLOSEST TO THE SHELL.

(9) THERMAL SHOCK: UNMATED CONNECTOR AFTER BEING TESTED IN ACCORDANCE WITH (8)a SHALL SHOW NO EIVDENCE OF CRACKING, FRACTURE, OR OTHER DAMAGE DETRIMENTAL TO THE OPERATION OF THE CONNECTOR.

(a) SHALL BE EXPOSED TO FIVE CONTINUOUS CYCLES OF TEMPERATURE CHANGES IN ACCORDANCE WITH METHOD 107. CONDITION B, OF MIL-STD-202 EXCEPT THAT THE LOW TEMPERATURE SHALL BE -55°C. THE INSERT SHALL NOT CRACK AS A RESULT OF THE TEST AND THE CONNECTORS SHALL MEET THE DIELECTRIC WITHSTANDING VOLTAGE TEST REQUIREMENTS AT SEA LEVEL AS SPECIFIED IN TABLE 2 UPON COMPLETION OF THE FINAL CYCLE

(10) AIR LEAKAGE: THE RECEPTACLES WHEN TESTED IN ACCORDANCE WITH 4a SHALL PREVENT THE LEAKAGE OF MORE THAN ONE CUBIC INCH OF AIR PER HOUR. THE AIR LEAKAGE SHALL BE MEASURED AT SPECIFIC TEMPERATURE AND PRESSURE.

(a) AIR LEAKAGE: UPON COMPLETION OF THE THERMAL SHOCK TEST (9) AND WHILE SUBJECT TO A PRESSURE DIFFERENTIAL OF 30 PSI AT A STABILIZED TEMPERATURE OF -55°C, CLASS R RECEPTACLES SHALL NOT HAVE A LEAKAGE RATE EXCEEDING 1 CUBIC INCH OF AIR PER HOUR MEASURED AT ATMOSPHERIC PRESSURE.

(11) CORROSION: UNMATED PLUGS AND RECEPTACLES AND FIVE SETS OF INDIVIDUAL PINS AND SOCKETS SHALL BE SUBJECTED TO A SALT SPRAY (CORROSION) TEST IN ACCORDANCE WITH STANDARD MIL-STD-202, METHOD 101, CONDITION B. IMMEDIATELY AFTER EXPOSURE, THE EXTERIOR SURFACES SHALL BE WASHED WITH.TAP WATER AND THE CONNECTORS DRIED FOR 12 HOURS IN A CIRCULATING AIR OVEN AT A TEMPERATURE OF 38° ± 3°C. UPON REMOVAL, THE MATED CONNECTORS SHALL MEET THE A-C TEST VOLTAGE SPECIFIED IN TABLE II, AND INDIVIDUAL PINS AND SOCKETS SHALL MEET THE RESISTANCE OF CONTACTS TEST AS SPECIFIED IN TABLE 6 THE EXPOSURE TO SALT-LADEN ATMOSPHERE SHALL NOT CAUSE SUFFICIENT CORROSION TO INTERFERE WITH MATING OR UNMATING THE CONNECTORS, NOR CAUSE EXPOSURE OF BASIC METAL.

TABLE 4

HIGH-POTENTIAL ALTITUDE REQUIREMENTS

ALTITUDE	UNMATED	MATED
SEA LEVEL	2500	2500
10,000	2500	2500
20,000	2000	2500
30,000	1500	1500
40,000	1200	1500
50,000	850	850
60,000	600	750
70,000	350	600

TABLE 3

CONTACT TENSILE LOADS

CONTACT SIZE	WIRE GAUGE	AXIAL DISPLACEMENT INCHES (MAX)	AXIAL LOAD ON CONTACT LOCKING DEVICE (EITHER DIRECTION) (POUNDS) MINIMUM
16	18	.020	10
16	16	.020	10
12	14	.020	15
12	12	.020	15

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REVISIONS		07584	
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 07584	4/14/64	wkl
A	REVISED PER TDRR 11686	25Aug64	wk

REQUIREMENTS CONTINUED:

(12) ALTITUDE IMMERSION: MATED CONNECTORS WHEN TESTED SHALL MAINTAIN AN INSULATION RESISTANCE OF 100 MEGOHMS OR GREATER, AND SHALL MEET THE HIGH POTENTIAL REQUIREMENTS ESTABLISHED IN TABLE 2.

(13) CONTACT REQUIREMENTS:
- (1) CRIMP BARREL SHALL ACCOMMODATE AND MEET PERFORMANCE SPECIFIED
  - (a) CONTACT SIZE 16 ACCOMMODATES 16, 18, 20 AWG.
  - (b) CONTACT SIZE 12 ACCOMMODATES 12, 14 AWG
- (2) ENGAGING AND SEPARATING FORCES
- (3) CRIMP TENSILE STRENGTH: THE STRENGTH OF THE INDIVIDUAL CONTACT TO WIRE CRIMP JOINT SHALL CONFORM TO STRENGTH VALUES OF TABLE 7.
- (4) CONTACT RETENTION: THE INDIVIDUAL CONTACT LOCKING MECHANISM ON UNMATED CONNECTORS SHALL WITHSTAND THE AXIAL LEADS AND AXIAL DISPLACEMENT SPECIFIED IN TABLE 5, WHEN TESTED AS SPECIFIED. INDIVIDUAL CONTACTS SHALL WITHSTAND AXIAL LOADS IN EITHER DIRECTION AS SHOWN IN TABLE 3. MEASUREMENTS SHALL BE MADE ON INDIVIDUAL CONTACTS WITH ALL OTHER CONTACTS IN PLACE AND THE INSERT IN A SHELL. THE LOAD SHALL BE APPLIED UNIFORMLY AT A RATE OF 1 POUND PER SECOND.

TABLE 1

CONTACT SIZES, WIRE RANGE ACCOMMODATIONS, & CURRENT RATINGS

CONTACT SIZE	WIRE RANGE ACCOMMODATIONS O.D. (INCHES)		CURRENT RATING AMPS.
	MIN.	MAX.	
16	.064	.130	20
12	.114	.170	41

TABLE 2

VOLTAGE FOR DIELECTRIC WITHSTANDING VOLTAGE TEST

SERVICE RATING	TEST VOLTAGE (RMS) (60 CPS)	AFTER HUMIDITY TEST VOLTAGE (RMS) (60 CPS)	AFTER CORROSION TEST VOLTAGE (RMS) (60 CPS)
INST	1,000	300	400
A	2,000	750	1,000
D	2,800	1,350	1,800
E	3,500	1,875	2,500
B	4,500	2,575	3,500
C	7,000	4,500	6,000

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MIT APPROVAL 4 Apr 64

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CONNECTOR-PLUG, ELECTRICAL,
PIN CONTACTS CRIMP TERMINATION

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010671
SCALE WT SHEET 4 OF 4

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REVISIONS 07584			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 07584	4/14/64	WK
A	REVISED PER TDRR 11686	1 Feb 64	WK
B	REVISED PER TDRR 19917	6/15/65	WK

REQUIREMENTS:

1. GENERAL:
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   - B. THESE CONNECTORS SHALL CONFORM TO THE REQUIREMENTS OF MIL-C-5015 (MS3106R28-20P) AND WITH THE PARTICULAR REQUIREMENTS LISTED BELOW.
   - C. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
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2. INSPECTION AND ACCEPTANCE:
   - A. ELECTRICAL REQUIREMENTS:
     - (1) ELECTRICAL CHARACTERISTICS (IN ACCORDANCE WITH THE MILITARY SPECIFICATIONS):
     - (2) DIELECTRIC WITHSTANDING VOLTAGE: PER TABLE 2 SERVICE RATING A
     - (3) INSULATION RESISTANCE: 5000 MEGOHMS MINIMUM (500 VDC)
   - B. MECHANICAL REQUIREMENTS:
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3. DESIGN REQUIREMENTS:
   - A. OPERATING LIFE: SEE RELIABILITY NOTE
   - B. STORAGE LIFE: STORAGE - THE CONNECTOR DESIGN AND CONSTRUCTION SHALL BE SUCH THAT THE CONNECTORS SHALL MEET THE REQUIREMENTS HEREIN AFTER STORAGE FOR ONE YEAR WHEN PACKAGED AS SPECIFIED.

TABLE 8

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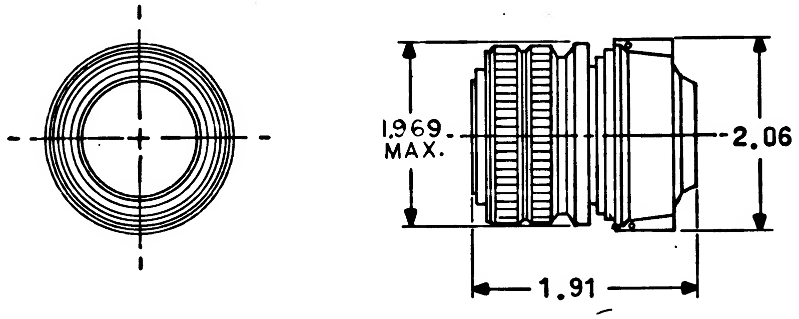

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MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

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REQUIREMENTS CONTINUED:

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(4) COUPLING: **THREADED COUPLING NUT.**
(5) SHELL: ALUMINUM ALLOY, PER QQ-A-591, FINISH PER MIL-F-14072, NUMBER E-516--ALUMILITE 225 (GRAY IN COLOR).
(6) INSERT: RESILIENT MATERIAL PER MIL-R-3065 CLASS SC717A, B AND E.

D. RELIABILITY: CONNECTORS SHALL BE CAPABLE OF WITHSTANDING 500 CYCLES OF ENGAGEMENT AND DISENGAGEMENT WITHOUT ELECTRICAL OR MECHANICAL FAILURE.

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(2) CONTACT RESISTANCE: PER TABLE 6
(3) CONTACT CURRENT RATING: NO. 16 AWG-22 AMPERES MAX. NO. 12 AWG-41 AMPERES MAXIMUM.
(4) VOLTAGE RATING: 700 VDC AND 500 VRMS
(5) INSERT ARRANGEMENT: PER MS33688-20
(6) VIBRATION: METHOD I. A COMPLETE CONNECTOR ASSEMBLY SHALL BE MOUNTED AS REQUIRED AND VIBRATED IN ACCORDANCE WITH VIBRATION TEST, PROCEDURE I, OF SPECIFICATION MIL-E-5272. ALL CONTACTS SHALL BE WIRED WITH THE PROPER WIRE SIZE IN ACCORDANCE WITH SPECIFICATION MIL-W-5086. ONE PAIR OF EACH SIZE CONTACTS, REPRESENTATIVE OF THE CONTACTS USED, SHALL BE CONNECTED TO A SUITABLE TESTING CIRCUIT WITH AT LEAST 100 MILLIAMPERES FLOWING THROUGH THE CONTACTS. THE PLUG AND RECEPTACLES SHALL BE HELD TOGETHER ONLY BY THE LOCKING MEANS NORMALLY PROVIDED. THE CONNECTORS, WHEN TESTED SHALL NOT CRACK OR BREAK, AND THERE SHALL BE NO LOOSENING OF PARTS. RECEPTACLES SHALL RETAIN PLUGS IN FULL ENGAGEMENT DURING VIBRATION. THERE SHALL BE NO INTERRUPTION OF THE ELECTRICAL CONTINUITY LONGER THAN 10 MICROSECONDS.
(7) PHYSICAL SHOCK: A MATED PLUG AND RECEPTACLE SHALL BE SUBJECTED TO A TRANSIENT DECELERATING FORCE PRODUCED BY SECURING THEM TO SUFFICIENT MASS, AND DROPPING THE ASSEMBLY THROUGH SUCH A HEIGHT THAT WHEN DECELERATED BY RESILIENT IMPACT, A DECELERATION OF 50 GRAVITY UNITS SHALL BE OBTAINED. THE PARTS OF THE CONNECTOR SHALL SHOW NO DAMAGE, AND THE CONTACTS SHALL MEET THE RESISTANCE OF CONTACTS TEST AS SPECIFIED IN TABLE 6 THE SHOCK TEST SHALL BE REPEATED IN EACH OF THE REFERENCED 90 DEGREE AXES POSITIONS. A SHOCK TESTING DEVICE IN ACCORDANCE WITH SPECIFICATION JAN-S-44, REVISED FOR CONNECTOR MOUNTING, IS A SATISFACTORY DEVICE FOR THIS TEST. THE CONNECTORS, DURING AND AFTER BEING TESTED SHALL SHOW NO SIGN OF DAMAGE.

TABLE 5

CONTACT ENGAGING AND SEPARATING FORCES

CONTACT SIZE	FORCE IN LBS.				
		RANDOM PINS		STEEL PIN	
	AVERAGE	MAXIMUM	MINIMUM	MINIMUM	MAXIMUM
16	2.1	3	0.25	0.10	1.90
12	3.5	5	0.50	0.20	3.20

TABLE 6

CONTACT SIZE	TEST CURRENT (AMPS)	POTENTIAL DROP (MILLIVOLTS) (MAX)	POTENTIAL DROP AFTER CORROSION TEST (MILLIVOLTS) (MAX)
16	20	21	35
12	35	20	30

TABLE 7

CONTACT CRIMP TENSILE LOADS

CONTACT SIZE	WIRE GAUGE	CRIMP JOINT TENSILE LOAD (POUNDS) (MIN)
16	18	38
16	16	50
12	14	70
12	12	110

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

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CONNECTOR-PLUG, ELECTRICAL,
PIN CONTACTS CRIMP TERMINATION

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
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SHEET 2 OF 4

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REVISIONS 07584			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 07584	4/14/64	WC
A	REVISED PER TDRR 11686		WC
B	REVISED PER TDRR 19917	6/15/65	WH

REQUIREMENTS CONTINUED:

(8) HIGH POTENTIAL ALTITUDE: CONNECTORS SHALL BE TESTED IN A SUITABLE CHAMBER AT ROOM TEMPERATURE. THE CONNECTORS SHALL BE TESTED AT 70,000 FT., AND SHALL BE TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301. THE APPLICABLE TEST VOLTAGE AS SHOWN IN TABLE 4 SHALL BE APPLIED BETWEEN THE TWO CLOSEST CONTACTS AND BETWEEN THE SHELL AND THE CONTACT OR CONTACTS CLOSEST TO THE SHELL.

(a) HIGH POTENTIAL: CONNECTORS SHALL BE TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301. TEST VOLTAGES, AS SHOWN IN TABLE 2 SHALL BE APPLIED BETWEEN THE TWO CLOSEST CONTACTS AND BETWEEN THE SHELL AND THE CONTACT OR CONTACTS CLOSEST TO THE SHELL.

TABLE 4

HIGH-POTENTIAL ALTITUDE REQUIREMENTS		
ALTITUDE	UNMATED	MATED
SEA LEVEL	2500	2500
10,000	2500	2500
20,000	2000	2500
30,000	1500	1500
40,000	1200	1500
50,000	850	850
60,000	600	750
70,000	350	600

(9) THERMAL SHOCK: UNMATED CONNECTOR AFTER BEING TESTED IN ACCORDANCE WITH (9)a SHALL SHOW NO EIVDENCE OF CRACKING, FRACTURE, OR OTHER DAMAGE DETRIMENTAL TO THE OPERATION OF THE CONNECTOR.

(a) SHALL BE EXPOSED TO FIVE CONTINUOUS CYCLES OF TEMPERATURE CHANGES IN ACCORDANCE WITH METHOD 107. CONDITION B, OF MIL-STD-202 EXCEPT THAT THE LOW TEMPERATURE SHALL BE -55°C. THE INSERT SHALL NOT CRACK AS A RESULT OF THE TEST AND THE CONNECTORS SHALL MEET THE DIELECTRIC WITHSTANDING VOLTAGE TEST REQUIREMENTS AT SEA LEVEL AS SPECIFIED IN TABLE 2 UPON COMPLETION OF THE FINAL CYCLE

(10) AIR LEAKAGE: THE CONNECTORS WHEN TESTED IN ACCORDANCE WITH 10a SHALL PREVENT THE LEAKAGE OF MORE THAN ONE CUBIC INCH OF AIR PER HOUR. THE AIR LEAKAGE SHALL BE MEASURED AT SPECIFIC TEMPERATURE AND PRESSURE.

(a) AIR LEAKAGE: UPON COMPLETION OF THE THERMAL SHOCK TEST (9) AND WHILE SUBJECT TO A PRESSURE DIFFERENTIAL OF 30 PSI AT A STABILIZED TEMPERATURE OF -55°C, CLASS R CONNECTORS SHALL NOT HAVE A LEAKAGE RATE EXCEEDING 1 CUBIC INCH OF AIR PER HOUR MEASURED AT ATMOSPHERIC PRESSURE.

TABLE 3

CONTACT TENSILE LOADS			
CONTACT SIZE	WIRE GAUGE	AXIAL DISPLACEMENT INCHES (MAX)	AXIAL LOAD ON CONTACT LOCKING DEVICE (EITHER DIRECTION) (POUNDS) MINIMUM
16	18	.020	10
16	16	.020	10
12	14	.020	15
12	12	.020	15

(11) CORROSION: UNMATED PLUGS AND RECEPTACLES AND FIVE SETS OF INDIVIDUAL PINS AND SOCKETS SHALL BE SUBJECTED TO A SALT SPRAY (CORROSION) TEST IN ACCORDANCE WITH STANDARD MIL-STD-202, METHOD 101, CONDITION B. IMMEDIATELY AFTER EXPOSURE, THE EXTERIOR SURFACES SHALL BE WASHED WITH TAP WATER AND THE CONNECTORS DRIED FOR 12 HOURS IN A CIRCULATING AIR OVEN AT A TEMPERATURE OF 38° ± 3°C. UPON REMOVAL, THE MATED CONNECTORS SHALL MEET THE A-C TEST VOLTAGE RATING A SPECIFIED IN TABLE 2 , AND INDIVIDUAL PINS AND SOCKETS SHALL MEET THE RESISTANCE OF CONTACTS TEST AS SPECIFIED IN TABLE 6 THE EXPOSURE TO SALT-LADEN ATMOSPHERE SHALL NOT CAUSE SUFFICIENT CORROSION TO INTERFERE WITH MATING OR UNMATING THE CONNECTORS, NOR CAUSE EXPOSURE OF BASIC METAL.

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PIN CONTACTS CRIMP TERMINATION

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REVISIONS 07584			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 07584	4/14/64	WK
A	REVISED PER TDRR 11686	25 Jun 64	WK
B	REVISED PER TDRR 19917	6/15/64	WK

REQUIREMENTS CONTINUED:

(12) ALTITUDE IMMERSION: MATED CONNECTORS WHEN TESTED SHALL MAINTAIN AN INSULATION RESISTANCE OF 100 MEGOHMS OR GREATER, AND SHALL MEET THE HIGH POTENTIAL REQUIREMENTS ESTABLISHED IN TABLE 4.

(13) CONTACT REQUIREMENTS:

(1) CRIMP BARREL SHALL ACCOMMODATE AND MEET REQUIREMENTS SPECIFIED IN TABLE I
  (a) CONTACT SIZE 16 ACCOMMODATES 16, 18, 20 AWG.
  (b) CONTACT SIZE 12 ACCOMMODATES 12, 14 AWG

(2) ENGAGING AND SEPARATING FORCES PER TABLE 5 (SOCKETS PER MS3193)

(3) CRIMP TENSILE STRENGTH: THE STRENGTH OF THE INDIVIDUAL CONTACT TO WIRE CRIMP JOINT SHALL CONFORM TO STRENGTH VALUES OF TABLE 7.

(4) CONTACT RETENTION: THE INDIVIDUAL CONTACT LOCKING MECHANISM ON UNMATED CONNECTORS SHALL WITHSTAND THE AXIAL LOADS AND AXIAL DISPLACEMENT SPECIFIED IN TABLE 3, WHEN TESTED AS SPECIFIED. INDIVIDUAL CONTACTS SHALL WITHSTAND AXIAL LOADS IN EITHER DIRECTION AS SHOWN IN TABLE 3. MEASUREMENTS SHALL BE MADE ON INDIVIDUAL CONTACTS WITH ALL OTHER CONTACTS IN PLACE AND THE INSERT IN A SHELL. THE LOAD SHALL BE APPLIED UNIFORMLY AT A RATE OF 1 POUND PER SECOND.

TABLE I

CONTACT SIZES, WIRE RANGE ACCOMMODATIONS, & CURRENT RATINGS

CONTACT SIZE	WIRE RANGE ACCOMMODATIONS O.D. (INCHES)		CURRENT RATING AMPS.
	MIN.	MAX.	
16	.064	.130	20
12	.114	.170	41

TABLE 2

VOLTAGE FOR DIELECTRIC WITHSTANDING VOLTAGE TEST

SERVICE RATING	TEST VOLTAGE (RMS) (60 CPS)	AFTER HUMIDITY TEST VOLTAGE (RMS) (60 CPS)	AFTER CORROSION TEST VOLTAGE (RMS) (60 CPS)
INST	1,000	300	400
A	2,000	750	1,000
D	2,800	1,350	1,800
E	3,500	1,875	2,500
B	4,500	2,575	3,500
C	7,000	4,500	6,000

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REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. THESE CONNECTORS SHALL CONFORM TO THE REQUIREMENTS OF MIL-C-5015 (MS3106R28-20P) AND WITH THE PARTICULAR REQUIREMENTS LISTED BELOW.
   - C. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - D. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002052 UNLESS MODIFIED OR AMENDED BY THE INSPECTION AND ACCEPTANCE REQUIREMENTS LISTED BELOW.
   - E. CONTACTS SUPPLIED SEPARATELY IN A PLIOFILM BAG(PER MIL-P-3803) OR EQUIVALENT WITH 10% SPARES

2. INSPECTION AND ACCEPTANCE:
   - A. ELECTRICAL REQUIREMENTS:
     - (1) ELECTRICAL CHARACTERISTICS (IN ACCORDANCE WITH THE MILITARY SPECIFICATIONS):
     - (2) DIELECTRIC WITHSTANDING VOLTAGE: PER TABLE 2
     - (3) INSULATION RESISTANCE: 5000 MEGOHMS MINIMUM (500 VDC)
   - B. MECHANICAL REQUIREMENTS:
     - (1) MARKING: UNITS SHALL BE PERMANENTLY AND LEGIBLY MARKED PER ND 1002019 WITH THE NASA PART NUMBER AND REVISION LETTER, AND THE MANUFACTURER'S NAME AND/OR SYMBOL. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. EACH CONTAINER SHALL INCLUDE THE NASA DRAWING AND DASH NUMBER PLUS THE REVISION LETTER PER MIL-STD-129.
     - (2) SEALING PLUGS: UNLESS OTHERWISE SPECIFED, CONNECTORS CONTAINING CONTACT SIZES 16, 12, AND 8 SHALL BE SUPPLIED WITH PLUGS OF THE APPROPRIATE SIZE CONFORMING TO MS25251. THE NUMBER OF PLUGS SUPPLIED SHALL BE EQUAL TO OR GREATER THAN 15 PERCENT OF EACH OF THE TOTAL NUMBER OF SIZE 16, 12, AND 8 CONTACTS CONTAINED IN THE INSERT ARRANGEMENT.

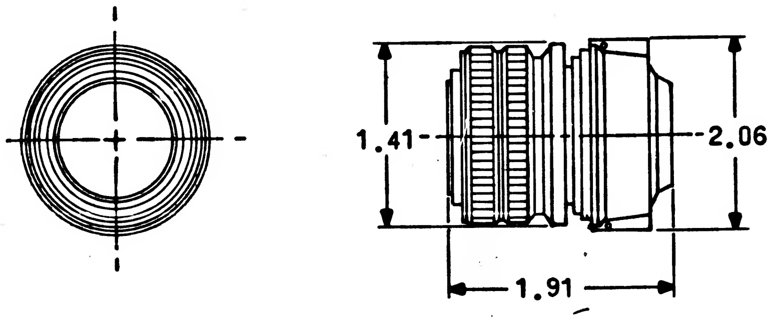
3. DESIGN REQUIREMENTS:
   - A. OPERATING LIFE: SEE RELIABILITY NOTE
   - B. STORAGE LIFE: STORAGE - THE CONNECTOR DESIGN AND CONSTRUCTION SHALL BE SUCH THAT THE CONNECTORS SHALL MEET THE REQUIREMENTS HEREIN AFTER STORAGE FOR ONE YEAR WHEN PACKAGED AS SPECIFIED.

-	-	-	-
SHEET 1	SHEET 2	SHEET 3	SHEET 4
REVISION STATUS OF SHEETS			

TABLE 8

NASA DASH NUMBER	NO. OF CONTACTS	INSERT ROTATION DEGREES
-1	10#12 AWG	0
-2	4#16 AWG	80

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.



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REQUIREMENTS CONTINUED:

C. CONSTRUCTION:

(1) TYPE CONNECTOR: ENVIRONMENT SEALED BY A GROMMET AND INSERT WITH A STRAIN RELIEF CLAMP, SOLID SHELL AND POSITIVE INSERT RETENTION.

(2) TYPE CONTACT: CRIMP CONTACTS PER MS3193 (PINS) MIN OF 0.00003 INCH MIN GOLD PLATE PER MIL-G-45204 OVER 0.0003 INCH SILVER PLATE PER QQ-S-365.

(3) NUMBER AND SIZE OF CONTACTS: SEE TABLE 8

(a) PERMEABILITY SHALL BE LESS THAN 2 MU.

(4) COUPLING: **THREADED COUPLING NUT.**

(5) SHELL: ALUMINUM ALLOY, PER QQ-A-591. FINISH PER MIL-F-14072, NUMBER E-516--ALUMILITE 225 (GRAY IN COLOR).

(6) INSERT: RESILIENT MATERIAL PER MIL-R-3065 CLASS SC717A, B AND E.

D. RELIABILITY: CONNECTORS SHALL BE CAPABLE OF WITHSTANDING 500 CYCLES OF ENGAGEMENT AND DISENGAGEMENT WITHOUT ELECTRICAL OR MECHANICAL FAILURE.

E. ELECTRICAL:

(1) INSULATION RESISTANCE (+125°C): 50 MEGOHMS MINIMUM (500 VDC)

(2) CONTACT RESISTANCE: PER TABLE 6

(3) CONTACT CURRENT RATING: NO. 16 AWG-22 AMPERES MAX. NO. 12 AWG-41 AMPERES MAXIMUM.

(4) VOLTAGE RATING: 700 VDC AND 500 VRMS

(5) INSERT ARRANGEMENT: PER MS33688-20

(6) VIBRATION: METHOD I. A COMPLETE CONNECTOR ASSEMBLY SHALL BE MOUNTED AS REQUIRED AND VIBRATED IN ACCORDANCE WITH VIBRATION TEST, PROCEDURE I, OF SPECIFICATION MIL-E-5272. ALL CONTACTS SHALL BE WIRED WITH THE PROPER WIRE SIZE IN ACCORDANCE WITH SPECIFICATION MIL-W-5086. ONE PAIR OF EACH SIZE CONTACTS, REPRESENTATIVE OF THE CONTACTS USED, SHALL BE CONNECTED TO A SUITABLE TESTING CIRCUIT WITH AT LEAST 100 MILLIAMPERES FLOWING THROUGH THE CONTACTS. THE PLUG AND RECEPTACLES SHALL BE HELD TOGETHER ONLY BY THE LOCKING MEANS NORMALLY PROVIDED. THE CONNECTORS, WHEN TESTED SHALL NOT CRACK OR BREAK, AND THERE SHALL BE NO LOOSENING OF PARTS. RECEPTACLES SHALL RETAIN PLUGS IN FULL ENGAGEMENT DURING VIBRATION. THERE SHALL BE NO INTERRUPTION OF THE ELECTRICAL CONTINUITY LONGER THAN 10 MICROSECONDS.

(7) PHYSICAL SHOCK: A MATED PLUG AND RECEPTACLE SHALL BE SUBJECTED TO A TRANSIENT DECELERATING FORCE PRODUCED BY SECURING THEM TO SUFFICIENT MASS, AND DROPPING THE ASSEMBLY THROUGH SUCH A HEIGHT THAT WHEN DECELERATED BY RESILIENT IMPACT, A DECELERATION OF 50 GRAVITY UNITS SHALL BE OBTAINED. THE PARTS OF THE CONNECTOR SHALL SHOW NO DAMAGE, AND THE CONTACTS SHALL MEET THE RESISTANCE OF CONTACTS TEST AS SPECIFIED IN TABLE 7 THE SHOCK TEST SHALL BE REPEATED IN EACH OF THE REFERENCED 90 DEGREE AXES POSITIONS. A SHOCK TESTING DEVICE IN ACCORDANCE WITH SPECIFICATION JAN-S-44, REVISED FOR CONNECTOR MOUNTING, IS A SATISFACTORY DEVICE FOR THIS TEST. THE CONNECTORS, DURING AND AFTER BEING TESTED SHALL SHOW NO SIGN OF DAMAGE.

TABLE 5

CONTACT ENGAGING AND SEPARATING FORCES

CONTACT SIZE	FORCE IN LBS.				
		RANDOM PINS		STEEL PIN	
	AVERAGE	MAXIMUM	MINIMUM	MINIMUM	MAXIMUM
16	2.1	3	0.25	0.10	1.90
12	3.5	5	0.50	0.20	3.20

TABLE 6

CONTACT SIZE	TEST CURRENT (AMPS)	POTENTIAL DROP (MILLIVOLTS) (MAX)	POTENTIAL DROP AFTER CORROSION TEST (MILLIVOLTS) (MAX)
16	20	21	35
12	35	20	30

TABLE 7

CONTACT CRIMP TENSILE LOADS

CONTACT SIZE	WIRE GAUGE	CRIMP JOINT TENSILE LOAD (POUNDS) (MIN)
16	18	38
16	16	50
12	14	70
12	12	110

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REQUIREMENTS CONTINUED:

(8) HIGH POTENTIAL ALTITUDE: CONNECTORS SHALL BE TESTED IN A SUITABLE CHAMBER AT ROOM TEMPERATURE. THE CONNECTORS SHALL BE TESTED AT 10,000 FT. INTERVALS STARTING AT 10,000 FT. AND CONCLUDING AT 70,000 FT., AND SHALL BE TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301. THE APPLICABLE TEST VOLTAGE AS SHOWN IN FIGURE I SHALL BE APPLIED BETWEEN THE TWO CLOSEST CONTACTS AND BETWEEN THE SHELL AND THE CONTACT OR CONTACTS CLOSEST TO THE SHELL.

(a) HIGH POTENTIAL: CONNECTORS SHALL BE TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 301. TEST VOLTAGES, AS SHOWN IN TABLE II SHALL BE APPLIED BETWEEN THE TWO CLOSEST CONTACTS AND BETWEEN THE SHELL AND THE CONTACT OR CONTACTS CLOSEST TO THE SHELL.

(9) THERMAL SHOCK: UNMATED CONNECTOR AFTER BEING TESTED IN ACCORDANCE WITH (8)a SHALL SHOW NO EIVDENCE OF CRACKING, FRACTURE, OR OTHER DAMAGE DETRIMENTAL TO THE OPERATION OF THE CONNECTOR.

(a) SHALL BE EXPOSED TO FIVE CONTINUOUS CYCLES OF TEMPERATURE CHANGES IN ACCORDANCE WITH METHOD 107. CONDITION B, OF MIL-STD-202 EXCEPT THAT THE LOW TEMPERATURE SHALL BE -55°C. THE INSERT SHALL NOT CRACK AS A RESULT OF THE TEST AND THE CONNECTORS SHALL MEET THE DIELECTRIC WITHSTANDING VOLTAGE TEST REQUIREMENTS AT SEA LEVEL AS SPECIFIED IN TABLE 2 UPON COMPLETION OF THE FINAL CYCLE

(10) AIR LEAKAGE: THE RECEPTACLES WHEN TESTED IN ACCORDANCE WITH 4a SHALL PREVENT THE LEAKAGE OF MORE THAN ONE CUBIC INCH OF AIR PER HOUR. THE AIR LEAKAGE SHALL BE MEASURED AT SPECIFIC TEMPERATURE AND PRESSURE.

(a) AIR LEAKAGE: UPON COMPLETION OF THE THERMAL SHOCK TEST (9) AND WHILE SUBJECT TO A PRESSURE DIFFERENTIAL OF 30 PSI AT A STABILIZED TEMPERATURE OF -55°C, CLASS R RECEPTACLES SHALL NOT HAVE A LEAKAGE RATE EXCEEDING 1 CUBIC INCH OF AIR PER HOUR MEASURED AT ATMOSPHERIC PRESSURE.

(11) CORROSION: UNMATED PLUGS AND RECEPTACLES AND FIVE SETS OF INDIVIDUAL PINS AND SOCKETS SHALL BE SUBJECTED TO A SALT SPRAY (CORROSION) TEST IN ACCORDANCE WITH STANDARD MIL-STD-202, METHOD 101, CONDITION B. IMMEDIATELY AFTER EXPOSURE, THE EXTERIOR SURFACES SHALL BE WASHED WITH TAP WATER AND THE CONNECTORS DRIED FOR 12 HOURS IN A CIRCULATING AIR OVEN AT A TEMPERATURE OF 38° ± 3°C. UPON REMOVAL, THE MATED CONNECTORS SHALL MEET THE A-C TEST VOLTAGE SPECIFIED IN TABLE II, AND INDIVIDUAL PINS AND SOCKETS SHALL MEET THE RESISTANCE OF CONTACTS TEST AS SPECIFIED IN TABLE 6 THE EXPOSURE TO SALT-LADEN ATMOSPHERE SHALL NOT CAUSE SUFFICIENT CORROSION TO INTERFERE WITH MATING OR UNMATING THE CONNECTORS, NOR CAUSE EXPOSURE OF BASIC METAL.

TABLE 4

HIGH-POTENTIAL ALTITUDE REQUIREMENTS

ALTITUDE	UNMATED	MATED
SEA LEVEL	2500	2500
10,000	2500	2500
20,000	2000	2500
30,000	1500	1500
40,000	1200	1500
50,000	850	850
60,000	600	750
70,000	350	600

TABLE 3

CONTACT TENSILE LOADS

CONTACT SIZE	WIRE GAUGE	AXIAL DISPLACEMENT INCHES (MAX)	AXIAL LOAD ON CONTACT LOCKING DEVICE (EITHER DIRECTION) (POUNDS) MINIMUM
16	18	.020	10
16	16	.020	10
12	14	.020	15
12	12	.020	15

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
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FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
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Contract NAS 9-497

DRAWN R W Turner DATE
CHECKED Ed. Foster 7 FEB 64
APPROVAL 4/14/64
APPROVAL
NASA APPROVAL 4/14/64
MIT APPROVAL 4 Apr 64

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CONNECTOR-PLUG, ELECTRICAL,
PIN CONTACTS CRIMP TERMINATION

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010671
SCALE
WT
SHEET 3 OF 4

—	1010671

REVISIONS 07584			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 07584	4/14/64	WK

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REQUIREMENTS CONTINUED:

(12) ALTITUDE IMMERSION: MATED CONNECTORS WHEN TESTED SHALL MAINTAIN AN INSULATION RESISTANCE OF 100 MEGOHMS OR GREATER, AND SHALL MEET THE HIGH POTENTIAL REQUIREMENTS ESTABLISHED IN TABLE 2.

(13) CONTACT REQUIREMENTS:
- (1) CRIMP BARREL SHALL ACCOMMODATE AND MEET PERFORMANCE SPECIFIED
  - (a) CONTACT SIZE 16 ACCOMMODATES 16, 18, 20, AWG.
  - (b) CONTACT SIZE 12 ACCOMMODATES 12, 14 AWG
- (2) ENGAGING AND SEPARATING FORCES
- (3) CRIMP TENSILE STRENGTH: THE STRENGTH OF THE INDIVIDUAL CONTACT TO WIRE CRIMP JOINT SHALL CONFORM TO STRENGTH VALUES OF TABLE 7.
- (4) CONTACT RETENTION: THE INDIVIDUAL CONTACT LOCKING MECHANISM ON UNMATED CONNECTORS SHALL WITHSTAND THE AXIAL LEADS AND AXIAL DISPLACEMENT SPECIFIED IN TABLE 5, WHEN TESTED AS SPECIFIED. INDIVIDUAL CONTACTS SHALL WITHSTAND AXIAL LOADS IN EITHER DIRECTION AS SHOWN IN TABLE 3. MEASUREMENTS SHALL BE MADE ON INDIVIDUAL CONTACTS WITH ALL OTHER CONTACTS IN PLACE AND THE INSERT IN A SHELL. THE LOAD SHALL BE APPLIED UNIFORMLY AT A RATE OF 1 POUND PER SECOND.

TABLE I

CONTACT SIZES, WIRE RANGE ACCOMMODATIONS, & CURRENT RATINGS

CONTACT SIZE	WIRE RANGE ACCOMMODATIONS O.D. (INCHES)		CURRENT RATING AMPS.
	MIN.	MAX.	
16	.064	.130	20
12	.114	.170	41

TABLE 2

VOLTAGE FOR DIELECTRIC WITHSTANDING VOLTAGE TEST

SERVICE RATING	TEST VOLTAGE (RMS) (60 CPS)	AFTER HUMIDITY TEST VOLTAGE (RMS) (60 CPS)	AFTER CORROSION TEST VOLTAGE (RMS) (60 CPS)
INST	1,000	300	400
A	2,000	750	1,000
D	2,800	1,350	1,800
E	3,500	1,875	2,500
B	4,500	2,575	3,500
C	7,000	4,500	6,000

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LIST OF MATERIALS

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DRAWN RW Turner DATE 27 Nov 64
CHECKED Ed Foster 7 FEB 64
APPROVAL 4/14/64
APPROVAL
NASA APPROVAL 4/14/64
MIT APPROVAL 4 April 64

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010671
SCALE
WT
SHEET 4 OF 4

1010671

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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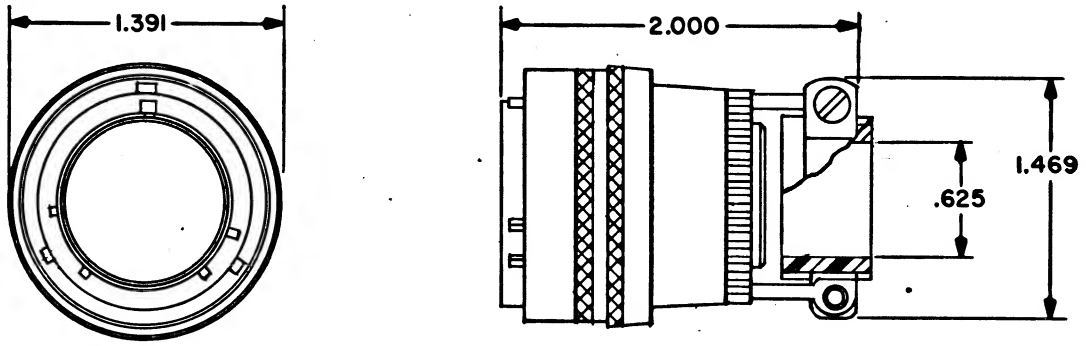
– 1010674

REVISIONS 05142

SYM	DESCRIPTION	DATE	APPROVAL
–	INITIAL RELEASE CLASS A PER TDRR 05142	10Dec63	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. THESE CONNECTORS SHALL CONFORM TO THE REQUIREMENTS OF MIL-C-26482 (MS3126F18-32S) AND WITH THE PARTICULAR REQUIREMENTS LISTED BELOW.
   - C. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - D. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002052 UNLESS MODIFIED OR AMENDED BY THE INSPECTION AND ACCEPTANCE REQUIREMENTS LISTED BELOW.
   - E. CONTACTS SUPPLIED SEPARATELY IN A PLIOFILM BAG WITH 10% SPARES.
   - F. CONTACTS SHALL BE PER ALL REQUIREMENTS OF MIL-C-23216 AND WIRE WELL AREA PER MS 3190.
2. INSPECTION AND ACCEPTANCE:
   - A. ELECTRICAL REQUIREMENTS:
     - (1) ELECTRICAL CHARACTERISTICS (IN ACCORDANCE WITH THE MILITARY SPECIFICATIONS):
     - (2) DIELECTRIC WITHSTANDING VOLTAGE: 1500 VRMS.
     - (3) INSULATION RESISTANCE: 5000 MEGOHMS MINIMUM (500 VDC)
   - B. MECHANICAL REQUIREMENTS:
     - (1) MARKING: UNITS SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE NASA PART NUMBER AND REVISION LETTER, AND THE MANUFACTURER'S NAME AND/OR SYMBOL. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. EACH CONTAINER SHALL INCLUDE THE NASA DRAWING AND DASH NUMBER PLUS THE REVISION LETTER.
3. DESIGN REQUIREMENTS:
   - A. OPERATING LIFE: SEE RELIABILITY NOTE
   - B. STORAGE LIFE: 1 YEAR WITHOUT GROMMET DETERIORATION.
   - C. CONSTRUCTION:
     - (1) TYPE CONNECTOR: ENVIRONMENT SEALED BY A GROMMET AND INSERT WITH A STRAIN RELIEF CLAMP, SOLID SHELL AND POSITIVE INSERT RETENTION.
     - (2) TYPE CONTACT: CRIMP CONTACTS PER MS3193 (SOCKETS)
     - (3) NUMBER AND SIZE OF CONTACTS: SEE TABLE
     - (4) COUPLING: BAYONET.
     - (5) SHELL: ALUMINUM ALLOY, PER QQ-A-591, FINISH PER MIL-F-14072, NUMBER E-516--ALUMILITE 225 (GRAY IN COLOR).
   - D. RELIABILITY: CONNECTORS SHALL BE CAPABLE OF WITHSTANDING 500 CYCLES OF ENGAGEMENT AND DISENGAGEMENT WITHOUT ELECTRICAL OR MECHANICAL FAILURE.
   - E. ELECTRICAL:
     - (1) INSULATION RESISTANCE (+125°C): 50 MEGOHMS MINIMUM. (500 VDC)
     - (2) CONTACT RESISTANCE: 50 MILLIVOLTS MAXIMUM AT RATED CURRENT.
     - (3) CONTACT CURRENT RATING: 7.5 AMPERES.
     - (4) VOLTAGE RATING: 700 VDC AND 500 VRMS
     - (5) INSERT ARRANGEMENT: PER MS 33713.



NASA PART NUMBER	NO. OF CONTACTS	INSERT ROTATION DEGREES
1010674-1	32#20AWG	0
-2		138
-3		222
-4		265

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING

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LIST OF MATERIALS

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MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

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DWG. NO. CONTRACT NAS 9-497
DRAWN R. Turner DATE 15 OCT 63
CHECKED C. Wilson 28 OCT 63
APPROVAL J. L. Nevins 12/10/63
APPROVAL
NASA APPROVAL W. S. Swingle 12/10/63
MIT APPROVAL W Kupfer 10 Dec 63

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CONNECTOR PLUG, ELECTRICAL,
CABLE CONNECTING,

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010674
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
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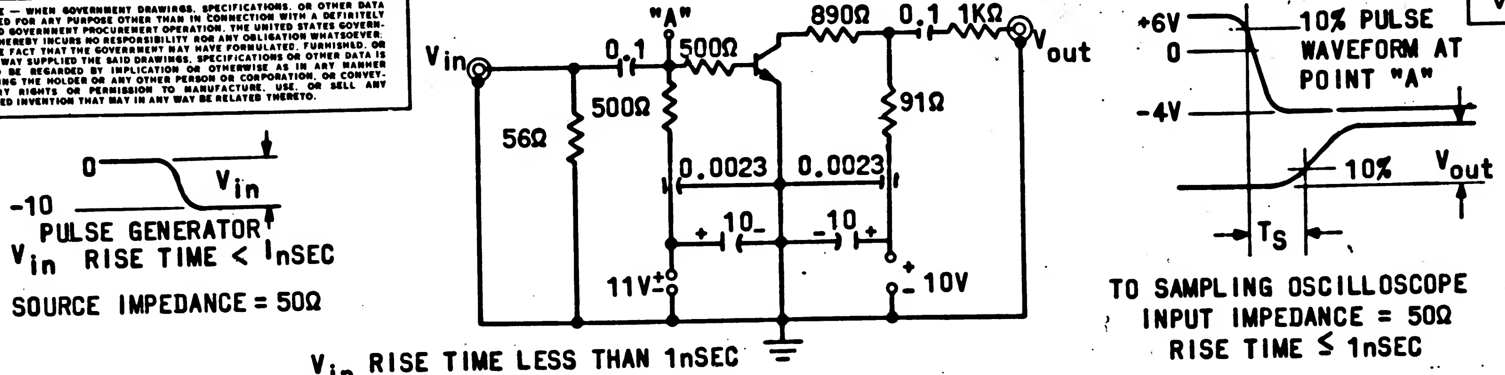
1010675 A

REVISIONS 05141

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05141	[illegible]	wK
A	REVISED PER TDRR 22443	9/28/[illegible]	wK

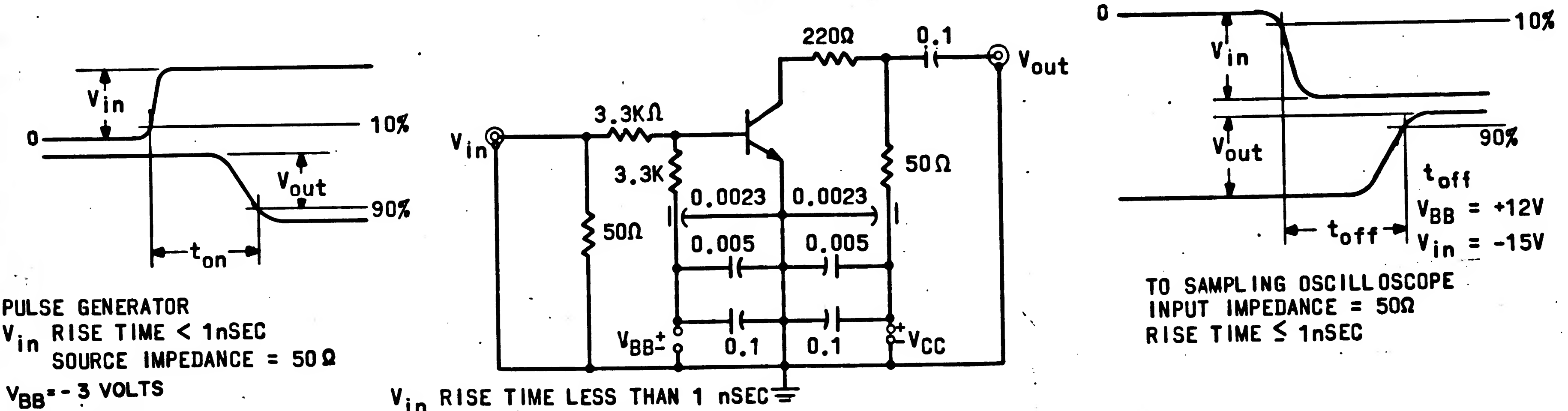


PULSE GENERATOR
Vin RISE TIME < 1nSEC
SOURCE IMPEDANCE = 50Ω

Vin RISE TIME LESS THAN 1nSEC
PW ≥ 300 nSEC
DUTY CYCLE < 2%

TO SAMPLING OSCILLOSCOPE
INPUT IMPEDANCE = 50Ω
RISE TIME ≤ 1nSEC

FIGURE 1

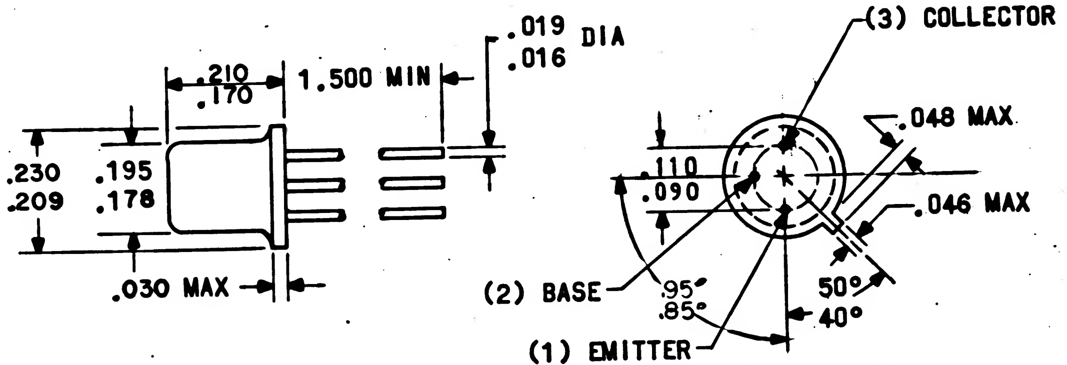


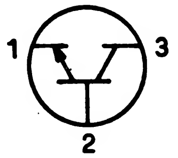
PULSE GENERATOR
Vin RISE TIME < 1nSEC
SOURCE IMPEDANCE = 50 Ω
VBB = - 3 VOLTS
VIN = + 15 VOLTS

Vin RISE TIME LESS THAN 1 nSEC
PW ≥ 300 nSEC
DUTY CYCLE < 2%

TO SAMPLING OSCILLOSCOPE
INPUT IMPEDANCE = 50Ω
RISE TIME ≤ 1nSEC

FIGURE 2





GRAPHICAL SYMBOL

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MATERIAL
SEE REQUIREMENTS
HEAT TREATMENT
NONE
FINAL FINISH
NONE

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DWG. NO.
CONTRACT NAS 9-497
DRAWN J. Patterson DATE 30 SEP63
CHECKED C. Pizjda 2OCT63
APPROVAL D. R. [illegible] for J. [illegible]
APPROVAL
NASA APPROVAL [illegible] 12/12/63
MIT APPROVAL W Kupfer 10Dec63

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REVISIONS 05141			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05141	10Dec63	WK
A	REVISED PER TDRR 22443	9/[illegible]/65	WK

(M)

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFROM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 1.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS OF ND 1002051, UNLESS MODIFIED OR AMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - D. UNIT PACKAGING PACKING AND CONTAINER MARKING SHALL BE IN ACCORDANCE WITH ND1002215 CLASS 1 CODE 2.
   - E. UNITS SHALL BE IN ACCORDANCE WITH MIL-S-19500 IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) LEAD DATA: SHALL BE PER ND 1015402. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
     - (2) MARKING: THE MANUFACTURER'S NAME, TRADEMARK OR CODE; DATE CODE; NASA DRAWING NUMBER, WHICH SHALL CONSIST OF AT LEAST THE LAST THREE DIGITS; AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER MIL-STD-130.
     - (3) MECHANICAL DIMENSIONS PER OUTLINE SHOWN.
   - B. ELECTRICAL REQUIREMENTS: PER TABLE II
     - (1) COLLECTOR CUTOFF CURRENT (I_{CBO3}) AT T_C=100°C
     - (2) SWITCHBACK VOLTAGE (LV_{CEO})
     - (3) COLLECTOR SATURATION VOLTAGE ($V_{CE(SAT)}$)
     - (4) BASE SATURATION VOLTAGE ($V_{BE(SAT)}$)
     - (5) STATIC FORWARD CURRENT TRANSFER RATIO (h_{FE1})
     - (6) CHARGE STORAGE TIME CONSTAT (TS)
     - (7) TURN ON TIME (TON.)
     - (8) TURN OFF TIME (TOFF)
   - (2) THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
     - a. EMITTER CUTOFF CURRENT (I_{EBO}).
     - b. COLLECTOR CUTOFF CURRENT, I_{CBO}
     - c. COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$
     - d. STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1} (AT LOWEST SPECIFIED COLLECTOR CURRENT)
   - (3) THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENTAGE CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN hFE, OR HAVING INCREASED MORE THAN 3 TIMES IN ICBO (THE ABSOLUTE INCREASE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.
3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL RATINGS: PER TABLE I
   - B. ELECTRICAL CHARACTERISTICS: PER TABLE II
   - C. STORAGE TEMPERATURE: -65°C TO +200°C
   - D. OPERATING JUNCTION TEMPERATURE: 200°C MAX
   - E. POWER DISSIPATION TOTAL, 25°C CASE TEMPERATURE: 1.2 WATTS.
     - (1) DERATING: 146 DEGREES CENTIGRADE PER WATT
   - F. POWER DISSIPATION TOTAL, 25°C AMBIENT TEMPERATURE: 360 MILLIWATTS.
     - (1) DERATING: 486 DEGREES CENTIGRADE PER WATT.
   - G. LIFE TEST CONDITIONS FOR ND 1002051 ARE THE SAME AS THE BURN-IN CONDITIONS, EXCEPT T_J = 150° C.
   - H. SPECIAL CONDITIONING BY SUPPLIER:
     - (1) BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
       - a. AMBIENT TEMPERATURE: 25°C ±5°C
       - b. COLLECTOR VOLTAGE V_{CB}: 10VDC ±5%
       - c. POWER DISSIPATION: 165 MW ±10%

TABLE I

MAXIMUM RATINGS AT T_C=25°C (UNLESS OTHERWISE SPECIFIED)

NASA PART NO.	COLLECTOR VOLTAGE (V_{CES})	COLLECTOR VOLTAGE (V_{CBO})	EMITTER VOLTAGE (V_{EBO})	COLLECTOR VOLTAGE (V_{CEO})	COLLECTOR CURRENT (I_C)	POWER DISSIPATION	EIA TYPE DESIGNATION (FOR REF ONLY)
1010675-1	VDC	VDC	VDC	VDC	MA	WATTS	
	40	40	5.0	17	500(PULSED)	1.2	2N2369

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QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

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DRAWN F. Petersen DATE 30 SEP63
CHECKED Ed Foster 20 Nov 63
APPROVAL D. Ritter for J. Sitomer
APPROVAL
NASA APPROVAL 12/11/63
MIT APPROVAL 10 Dec 63

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—	C	1010675
SCALE NONE	WT	SHEET 2 OF 3

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1010675 A

REVISIONS 05141			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05141		WK
A	REVISED PER TDRR 22443	9/24/65	WK

TABLE II

ELECTRICAL CHARACTERISTICS AT T_C = 25°C (UNLESS OTHERWISE SPECIFIED)

PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN.	LIMITS MAX.	UNITS
COLLECTOR CUT-OFF CURRENT	VCB=20V IE=0	$ICBO_1$	-	.4	uA
COLLECTOR CUT-OFF CURRENT	VCB=20V IE=0 TC=150°C	$ICBO_2$		70	uA
COLLECTOR CUT-OFF CURRENT	TC=100°C VCB=20V	$ICBO_3$	-	10	uA
EMITTER CUT-OFF CURRENT	V_{EB}= 4.5V IC=0	IEBO	-	10	uA
BREAKDOWN VOLTAGE, COLLECTOR TO BASE	IC=10uA IE=0	BVCBO	40	-	VOLTS
BREAKDOWN VOLTAGE, EMITTER TO BASE	IE=10uA IC=0	BVEBO	5.0	-	VOLTS
SWITCHBACK VOLTAGE	IC=10mA IB=0	LVCEO	17	-	VOLTS
COLLECTOR SATURATION VOLTAGE	IB=1mA IC=10mA	VCE(sat)	-	.25	VOLTS
BASE SATURATION VOLTAGE	IB=1mA IC=10mA	VBE(sat)	.7	.85	VOLT
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=1.0V IC=10mA	hFE_1	40	120	-
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=2.0V IC=100mA	hFE_2	20	-	-
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=1.0V IC=10mA T=-55°C	hFE_3	20	-	-
SMALL-SIGNAL, SHORT CIRCUIT FORWARD CURRENT TRANSFER RATIO	VCE=10V IC=10mA f=100mc	hfe	5	-	-
OUTPUT CAPACITANCE	VCB=5V IE=0	Cob	-	4	uuf
INPUT CAPACITANCE	VEB=0.5V	Cib	-	4	uuf
CHARGE STORAGE TIME CONSTANT (SEE FIGURE 1)	$IC=IB_1=IB_2$= 10mA	TS	-	13	n sec
TURN ON TIME (SEE FIGURE 2)	IC=10mA IB_1=3mA IB_2=1.5mA	Ton	-	12	n sec
TURN OFF TIME (SEE FIGURE 2)	IC=10mA IB_1=3mA IB_2=1.5mA	Toff	-	18	n sec

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

HEAT TREATMENT

FINAL FINISH

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INSTRUMENTATION LAB
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DWG. NO. NAS CONTRACT 9-497

DRAWN Patterson DATE 30 SEP 63
CHECKED C. Pizzida 2 OCT 63
APPROVAL D. R. Test for J. Atomus
APPROVAL
NASA APPROVAL 2/10/63
MIT APPROVAL 10 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR
SILICON, NPN

SPECIFICATION CONTROL DRAWING

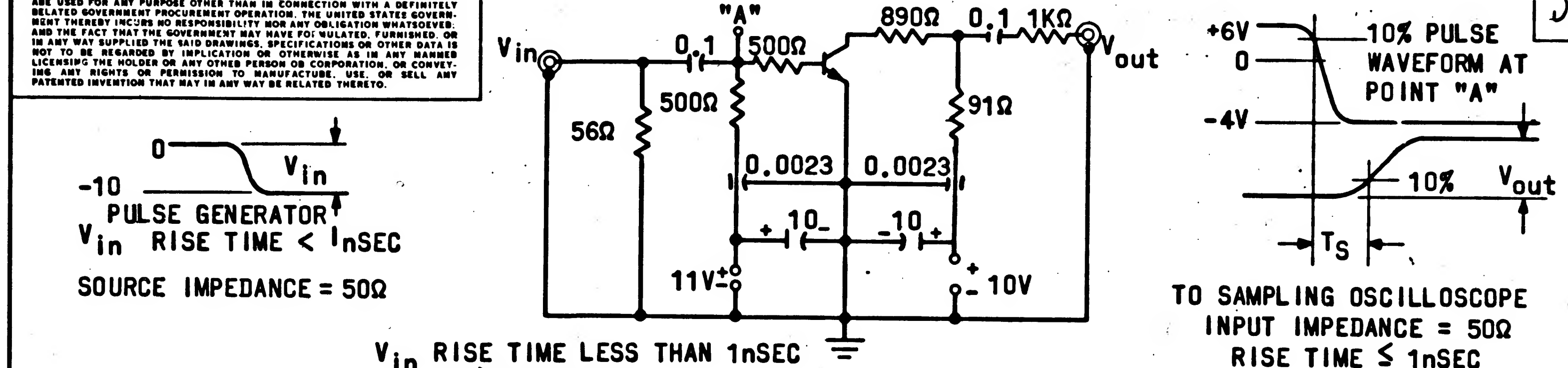
CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010675
SCALE
WT
SHEET 3 OF 3

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER: AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 0514

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05141	14 Oct 63	WK
A	REVISED PER TDRR 22443	9/28/65	WK
B	REVISED PER TDRR 23180	11/10/65	WK
C	REVISION STATUS CHANGED	10 DEC 66	REF CP

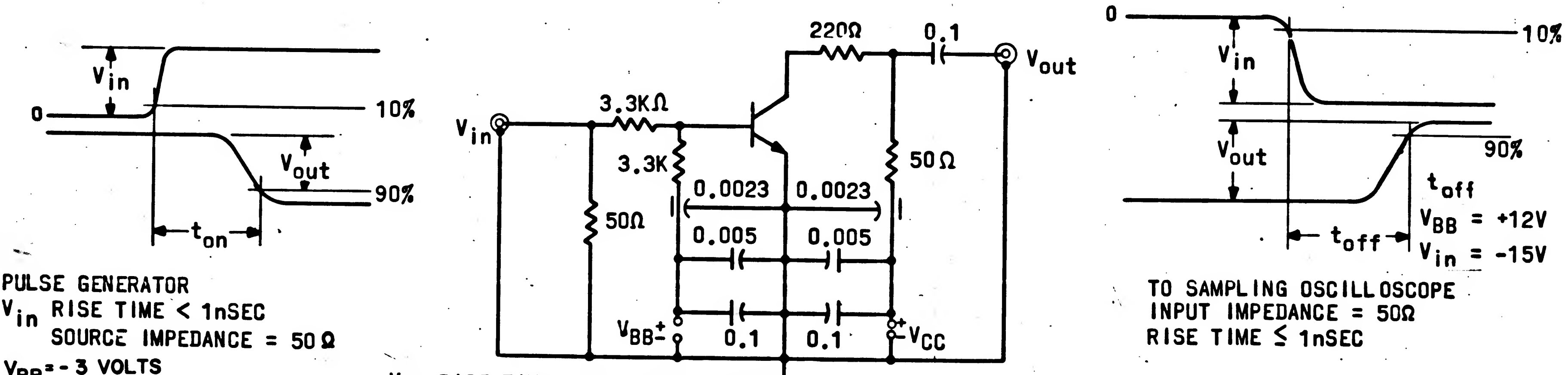


PULSE GENERATOR
V_{in} RISE TIME < 1nSEC
SOURCE IMPEDANCE = 50Ω

V_{in} RISE TIME LESS THAN 1nSEC
PW ≥ 300 nSEC
DUTY CYCLE < 2%

TO SAMPLING OSCILLOSCOPE
INPUT IMPEDANCE = 50Ω
RISE TIME ≤ 1nSEC

FIGURE 1



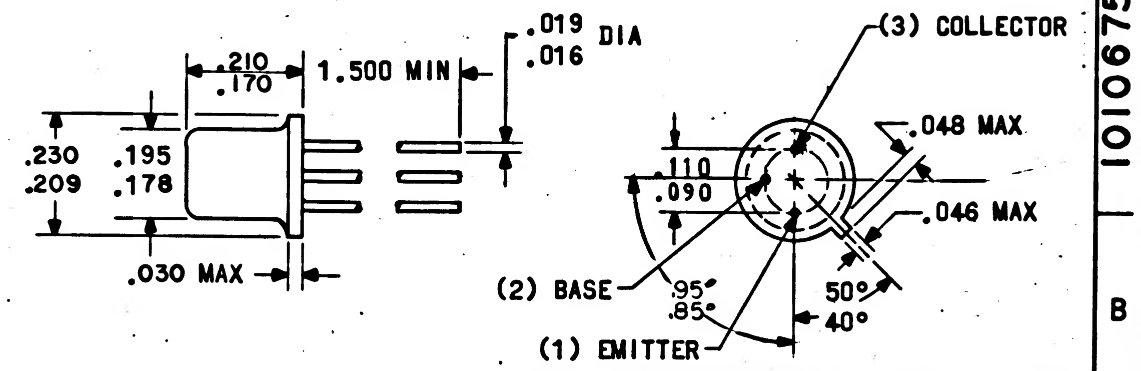
PULSE GENERATOR
V_{in} RISE TIME < 1nSEC
SOURCE IMPEDANCE = 50Ω
V_{BB} = - 3 VOLTS
V_{IN} = + 15 VOLTS

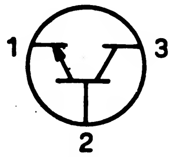
V_{in} RISE TIME LESS THAN 1 nSEC
PW ≥ 300 nSEC
DUTY CYCLE < 2%

V_{BB} = +12V
V_{in} = -15V

TO SAMPLING OSCILLOSCOPE
INPUT IMPEDANCE = 50Ω
RISE TIME ≤ 1nSEC

FIGURE 2





GRAPHICAL SYMBOL

PROCURE ONLY FROM APPROVED SOURCES LISTED
ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
NONE

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DWG. NO.
NAS
CONTRACT 9-497

DRAWN J. Patterson DATE 30 SEP 63
CHECKED C. Pizida 2 OCT 63
APPROVAL D. R. Tait for J. Sitomer
APPROVAL
NASA APPROVAL 12/11/63
MIT APPROVAL W Kupfer 10 Dec 63

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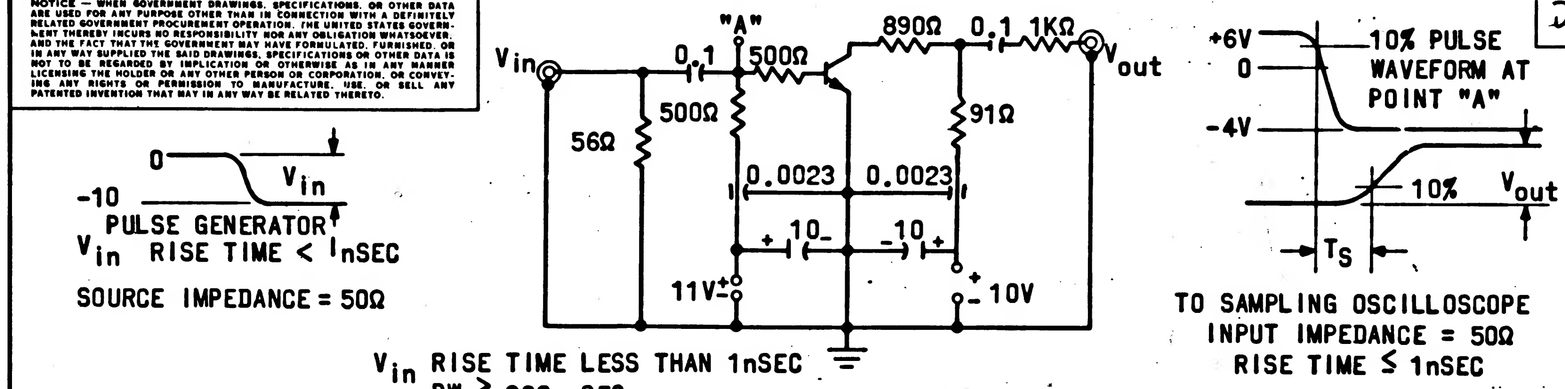
CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010675
SCALE NONE
WT
SHEET 1 OF 3

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010675 C

REVISIONS 05141			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05141	[illegible]	WK
A	REVISED PER TDRR 22443	9/28/64	WK
B	REVISED PER TDRR 23180	11/10/65	WK
C	REVISION STATUS CHANGED	10 DEC 66	REF CP

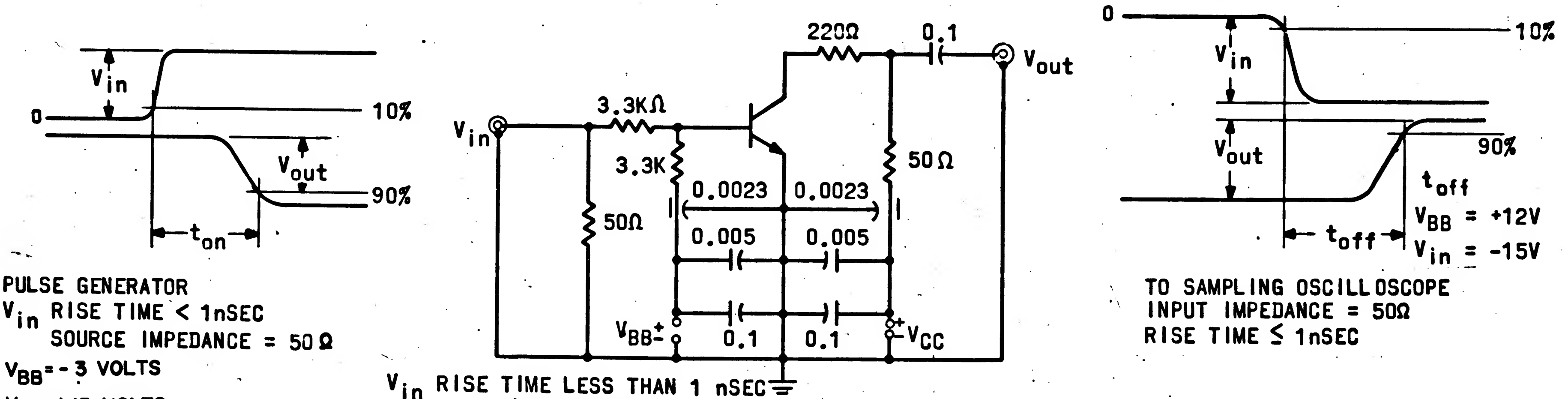


PULSE GENERATOR
Vin RISE TIME < 1nSEC
SOURCE IMPEDANCE = 50Ω

Vin RISE TIME LESS THAN 1nSEC
PW ≥ 300 nSEC
DUTY CYCLE < 2%

TO SAMPLING OSCILLOSCOPE
INPUT IMPEDANCE = 50Ω
RISE TIME ≤ 1nSEC

FIGURE 1



PULSE GENERATOR
Vin RISE TIME < 1nSEC
SOURCE IMPEDANCE = 50Ω
V_{BB} = - 3 VOLTS
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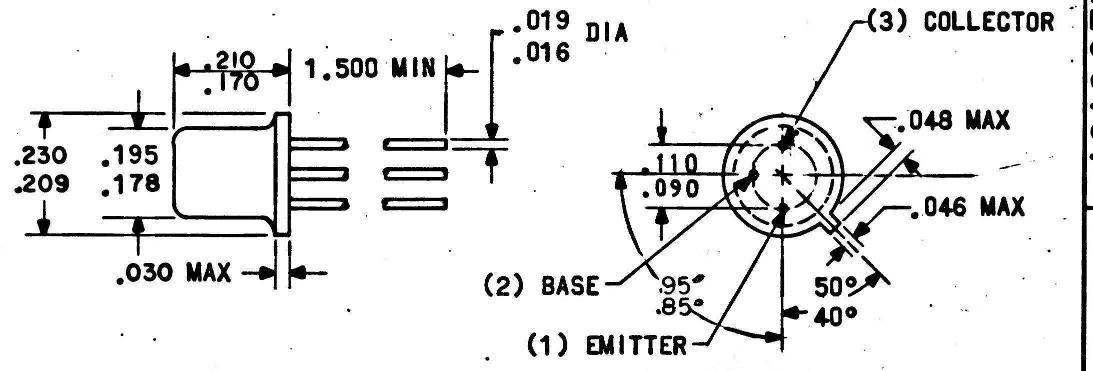
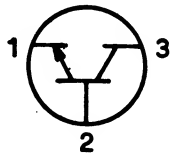
V_{BB} = +12V
V_{in} = -15V

TO SAMPLING OSCILLOSCOPE
INPUT IMPEDANCE = 50Ω
RISE TIME ≤ 1nSEC

FIGURE 2



1010675 C



GRAPHICAL SYMBOL

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
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FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
SEE REQUIREMENTS
HEAT TREATMENT
NONE
FINAL FINISH
NONE

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INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN J. Patterson DATE 30 SEP63
CHECKED C. Pizzida 2 OCT 63
APPROVAL D. R. Test for J. Sitomer
APPROVAL
NASA APPROVAL 12/11/63
MIT APPROVAL W Kupfer 10 Dec

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TRANSISTOR
SILICON, NPN
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010675
SCALE NONE
WT
SHEET 1 OF 3

1010675 C

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REVISIONS 05141			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05141	14Dec63	WK
A	REVISED PER TDRR 22443	9/6/65	WK
B	REVISED PER TDRR 23180	11/10/65	WK
C	REVISED PER TDRR 32221	10 DEC. 66	REF

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFROM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 1.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS OF ND 1002051, UNLESS MODIFIED OR AMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - D. PRESERVATION PACKAGING, PACKING, AND CONTAINER MARKING SHALL BE IN ACCORDANCE WITH ND1002215 CLASS 1 CODE 2.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) LEAD DATA: SHALL BE PER ND1015402. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
     - (2) MARKING: THE NASA DRAWING NUMBER (LAST THREE DIGITS REQ'D), DASH NO. & THE MANUFACTURER'S NAME, TRADEMARK OR CODE: DATE CODE, LOT CODE, AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND 1002019. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL INCLUDE THE NASA DRAWING NUMBER. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.
     - (3) MECHANICAL DIMENSIONS PER OUTLINE SHOWN.
   - B. ELECTRICAL REQUIREMENTS: PER TABLE II
     - (1) COLLECTOR CUTOFF CURRENT (I_{CB03}) AT T_C=100°C
     - (2) SWITCHBACK VOLTAGE (LV_{CEO})
     - (3) COLLECTOR SATURATION VOLTAGE ($V_{CE(SAT)}$)
     - (4) BASE SATURATION VOLTAGE ($V_{BE(SAT)}$)
     - (5) STATIC FORWARD CURRENT TRANSFER RATIO (hFE1)
     - (6) CHARGE STORAGE TIME CONSTAT (TS)
     - (7) TURN ON TIME (TON.)
     - (8) TURN OFF TIME (TOFF).

3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL RATINGS: PER TABLE I
   - B. ELECTRICAL CHARACTERISTICS: PER TABLE II
   - C. STORAGE TEMPERATURE: -65°C TO +200°C
   - D. OPERATING JUNCTION TEMPERATURE: 200°C MAX
   - E. POWER DISSIPATION TOTAL, 25°C CASE TEMPERATURE: 1.2 WATTS.
     - (1) DERATING: 146 DEGREES CENTIGRADE PER WATT
   - F. POWER DISSIPATION TOTAL, 25°C AMBIENT TEMPERATURE: 360 MILLIWATTS.
     - (1) DERATING: 486 DEGREES CENTIGRADE PER WATT.
   - G. LIFE TEST CONDITIONS FOR ND 1002051 ARE THE SAME AS THE BURN-IN CONDITIONS, EXCEPT T_J = 150°C.

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. ALL UNITS SHALL HAVE SUCCESSFULLY PASSED THE FOLLOWING SCREENING TESTS PERFORMED DURING THE TIME INTERVAL BETWEEN FINAL SEAL AND THE 240 HOUR BURN-IN.
     - (1) ACCELERATION AT 20,000 G MINIMUM IN THE Y_1 ORIENTATION PER MIL-STD-750, METHOD 2006, OR IMPACT SHOCK AT 28K G MINIMUM IN THE Y_1 ORIENTATION.
     - (2) HELIUM LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION C, PROCEDURE III a OR b, A LEAK RATE OF 1 X 10^{-8} ATM CC/SEC OR GREATER SHALL CONSTITUTE A FAILURE.
     - (3) GROSS LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION A. GLYCERIN MAY BE USED IN LIEU OF MINERAL OIL.
   - B. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
     - a. AMBIENT TEMPERATURE: 25°C ± 5°C
     - b. COLLECTOR VOLTAGE V_{CB}: 10VDC ±5%
     - c. POWER DISSIPATION: 165 MW ±10%
   - (C) THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
     - a. EMITTER CUTOFF CURRENT (I_{EBO}).
     - b. COLLECTOR CUTOFF CURRENT, I_{CBO}
     - c. COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$
     - d. STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1} (AT LOWEST SPECIFIED COLLECTOR CURRENT)
   - (D) THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENTAGE CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN hFE, OR HAVING INCREASED MORE THAN 3 TIMES IN ICBO (THE ABSOLUTE INCREASE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.

TABLE I

MAXIMUM RATINGS AT T_C=25°C (UNLESS OTHERWISE SPECIFIED)

NASA PART NO.	COLLECTOR VOLTAGE (V_{CES})	COLLECTOR VOLTAGE (V_{CBO})	EMITTER VOLTAGE (V_{EBO})	COLLECTOR VOLTAGE (V_{CEO})	COLLECTOR CURRENT (I_C)	POWER DISSIPATION	EIA TYPE DESIGNATION (FOR REF ONLY)
	VDC	VDC	VDC	VDC	MA	WATTS	
1010675-1	40	40	5.0	17	100	1.2	2N2369

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS. NAS
DWG. NO. CONTRACT 9-497
DRAWN F. Peterson DATE 30 SEP63
CHECKED Ed Foster 20 Nov 63
APPROVAL D. R. Test for J. Sitomer
APPROVAL
NASA APPROVAL 12/11/63
MIT APPROVAL 10 Dec 63

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HOUSTON, TEXAS

TRANSISTOR
SILICON, NPN

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010675
SCALE NONE
WT
SHEET 2 OF 3

1010675 C

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1010675 C

REVISIONS 05141			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05141	10 Dec 63	WK
A	REVISED PER TDRR 22443	9/13/65	WK
B	REVISED PER TDRR 23180	11/10/65	WK
C	REVISED PER TDRR 32221	10 DEC. 66	REF

REQUIREMENTS:

1. GENERAL:
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   - B. SUPPLIER SHALL CONFROM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 1.
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   - D. PRESERVATION PACKAGING, PACKING, AND CONTAINER MARKING SHALL BE IN ACCORDANCE WITH ND1002215 CLASS 1 CODE 2.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) LEAD DATA: SHALL BE PER ND1015402. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
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     - (3) MECHANICAL DIMENSIONS PER OUTLINE SHOWN.
   - B. ELECTRICAL REQUIREMENTS: PER TABLE II
     - (1) COLLECTOR CUTOFF CURRENT (I_{CBO3}) AT T_C=100°C
     - (2) SWITCHBACK VOLTAGE (LV_{CEO})
     - (3) COLLECTOR SATURATION VOLTAGE ($V_{CE(SAT)}$)
     - (4) BASE SATURATION VOLTAGE ($V_{BE(SAT)}$)
     - (5) STATIC FORWARD CURRENT TRANSFER RATIO (hFE1)
     - (6) CHARGE STORAGE TIME CONSTAT (TS)
     - (7) TURN ON TIME (TON.)
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3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL RATINGS: PER TABLE I
   - B. ELECTRICAL CHARACTERISTICS: PER TABLE II
   - C. STORAGE TEMPERATURE: -65°C TO +200°C
   - D. OPERATING JUNCTION TEMPERATURE: 200°C MAX
   - E. POWER DISSIPATION TOTAL, 25°C CASE TEMPERATURE: 1.2 WATTS.
     - (1) DERATING: 146 DEGREES CENTIGRADE PER WATT
   - F. POWER DISSIPATION TOTAL, 25°C AMBIENT TEMPERATURE: 360 MILLIWATTS.
     - (1) DERATING: 486 DEGREES CENTIGRADE PER WATT.
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     - (1) ACCELERATION AT 20,000 G MINIMUM IN THE Y_1 ORIENTATION PER MIL-STD-750, METHOD 2006, OR IMPACT SHOCK AT 28K G MINIMUM IN THE Y_1 ORIENTATION.
     - (2) HELIUM LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION C, PROCEDURE III a OR b, A LEAK RATE OF 1 X 10^{-8} ATM CC/SEC OR GREATER SHALL CONSTITUTE A FAILURE.
     - (3) GROSS LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION A. GLYCERIN MAY BE USED IN LIEU OF MINERAL OIL.
   - B. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
     - a. AMBIENT TEMPERATURE: 25°C ± 5°C
     - b. COLLECTOR VOLTAGE V_{CB}: 10VDC ±5%
     - c. POWER DISSIPATION: 165 MW ±10%
   - (C) THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
     - a. EMITTER CUTOFF CURRENT (I_{EBO}).
     - b. COLLECTOR CUTOFF CURRENT, I_{CBO}
     - c. COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$
     - d. STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1} (AT LOWEST SPECIFIED COLLECTOR CURRENT)
   - (D) THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENTAGE CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN hFE, OR HAVING INCREASED MORE THAN 3 TIMES IN ICBO (THE ABSOLUTE INCREASE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.

TABLE I

MAXIMUM RATINGS AT T_C=25°C (UNLESS OTHERWISE SPECIFIED)

NASA PART NO.	COLLECTOR VOLTAGE (V_{CES})	COLLECTOR VOLTAGE (V_{CBO})	EMITTER VOLTAGE (V_{EBO})	COLLECTOR VOLTAGE (V_{CEO})	COLLECTOR CURRENT (I_C)	POWER DISSIPATION	EIA TYPE DESIGNATION (FOR REF ONLY)
1010675-1	VDC	VDC	VDC	VDC	MA	WATTS	
	40	40	5.0	17	100	1.2	2N2369

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

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SILICON, NPN

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. ——
SIZE C
NASA DRAWING NO. 1010675
SCALE NONE
WT
SHEET 2 OF 3

1010675 C

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1010675 C

REVISIONS 05141

SYM.	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05141	1 Dec 63	WK
A	REVISED PER TDRR 22443	9/28/65	WK
B	REVISED PER TDRR 23180	11/16/65	WK
C	REVISION STATUS CHANGED	10 DEC 66	REF

TABLE II

ELECTRICAL CHARACTERISTICS AT T$_C$ = 25°C (UNLESS OTHERWISE SPECIFIED)

PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN.	LIMITS MAX.	UNITS
COLLECTOR CUT-OFF CURRENT	VCB=20V IE=0	ICBO$_1$	-	.4	uA
COLLECTOR CUT-OFF CURRENT	VCB=20V IE=0 TC=150°C	ICBO$_2$		70	uA
COLLECTOR CUT-OFF CURRENT	TC=100°C VCB=20V	ICBO$_3$	-	10	uA
EMITTER CUT-OFF CURRENT	V$_{EB}$= 4.5V IC=0	IEBO	-	10	uA
BREAKDOWN VOLTAGE, COLLECTOR TO BASE	IC=10uA IE=0	BVCBO	40	-	VOLTS
BREAKDOWN VOLTAGE, EMITTER TO BASE	IE=10uA IC=0	BVEBO	5.0	-	VOLTS
SWITCHBACK VOLTAGE	IC=10mA IB=0	LVCEO	17	-	VOLTS
COLLECTOR SATURATION VOLTAGE	IB=1mA IC=10mA	VCE(sat)	-	.25	VOLTS
BASE SATURATION VOLTAGE	IB=1mA IC=10mA	VBE(sat)	.7	.85	VOLT
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=1.0V IC=10mA	hFE$_1$	40	120	-
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=2.0V IC=100mA	hFE$_2$	20	-	-
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=1.0V IC=10mA T=-55°C	hFE$_3$	20	-	-
SMALL-SIGNAL, SHORT CIRCUIT FORWARD CURRENT TRANSFER RATIO	VCE=10V IC=10mA f=100mc	hfe	5	-	-
OUTPUT CAPACITANCE	VCB=5V IE=0	Cob	-	4	uuf
INPUT CAPACITANCE	VEB=0.5V	Cib	-	4	uuf
CHARGE STORAGE TIME CONSTANT (SEE FIGURE 1)	IC=IB$_1$=IB$_2$=10mA	TS	-	13	n sec
TURN ON TIME (SEE FIGURE 2)	IC=10mA IB$_1$=3mA IB$_2$=1.5mA	Ton	-	12	n sec
TURN OFF TIME (SEE FIGURE 2)	IC=10mA IB$_1$=3mA IB$_2$=1.5mA	Toff	-	18	n sec

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

HEAT TREATMENT

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DRAWN Patterson DATE 30 SEP 63
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APPROVAL
NASA APPROVAL 12/10/63
MIT APPROVAL 10 Dec 63

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CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010675
SCALE
WT
SHEET 3 OF 3

1010675 C

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1010675 C

REVISIONS 05141

SYM.	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05141	1 Dec 63	WK
A	REVISED PER TDRR 22443	9/28/65	WK
B	REVISED PER TDRR 23180	11/16/65	WK
C	REVISION STATUS CHANGED	10 DEC 66	REF

TABLE II

ELECTRICAL CHARACTERISTICS AT T_C = 25°C (UNLESS OTHERWISE SPECIFIED)

PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN.	LIMITS MAX.	UNITS
COLLECTOR CUT-OFF CURRENT	VCB=20V IE=0	I_{CBO1}	-	.4	uA
COLLECTOR CUT-OFF CURRENT	VCB=20V IE=0 TC=150°C	I_{CBO2}		70	uA
COLLECTOR CUT-OFF CURRENT	TC=100°C VCB=20V	I_{CBO3}	-	10	uA
EMITTER CUT-OFF CURRENT	V_{EB}= 4.5V IC=0	IEBO	-	10	uA
BREAKDOWN VOLTAGE, COLLECTOR TO BASE	IC=10uA IE=0	BVCBO	40	-	VOLTS
BREAKDOWN VOLTAGE, EMITTER TO BASE	IE=10uA IC=0	BVEBO	5.0	-	VOLTS
SWITCHBACK VOLTAGE	IC=10mA IB=0	LVCEO	17	-	VOLTS
COLLECTOR SATURATION VOLTAGE	IB=1mA IC=10mA	VCE(sat)	-	.25	VOLTS
BASE SATURATION VOLTAGE	IB=1mA IC=10mA	VBE(sat)	.7	.85	VOLT
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=1.0V IC=10mA	h_{FE1}	40	120	-
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=2.0V IC=100mA	h_{FE2}	20	-	-
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=1.0V IC=10mA T=-55°C	h_{FE3}	20	-	-
SMALL-SIGNAL, SHORT CIRCUIT FORWARD CURRENT TRANSFER RATIO	VCE=10V IC=10mA f=100mc	hfe	5	-	-
OUTPUT CAPACITANCE	VCB=5V IE=0	Cob	-	4	uuf
INPUT CAPACITANCE	VEB=0.5V	Cib	-	4	uuf
CHARGE STORAGE TIME CONSTANT (SEE FIGURE 1)	$IC=IB_1=IB_2=$ 10mA	TS	-	13	n sec
TURN ON TIME (SEE FIGURE 2)	IC=10mA IB_1=3mA IB_2=1.5mA	Ton	-	12	n sec
TURN OFF TIME (SEE FIGURE 2)	IC=10mA IB_1=3mA IB_2=1.5mA	Toff	-	18	n sec

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
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APPROVAL
NASA APPROVAL 12/16/63
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CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010675
SCALE
WT
SHEET 3 OF 3

1010675 C

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05141	10Oct63	WK

REVISIONS 05141

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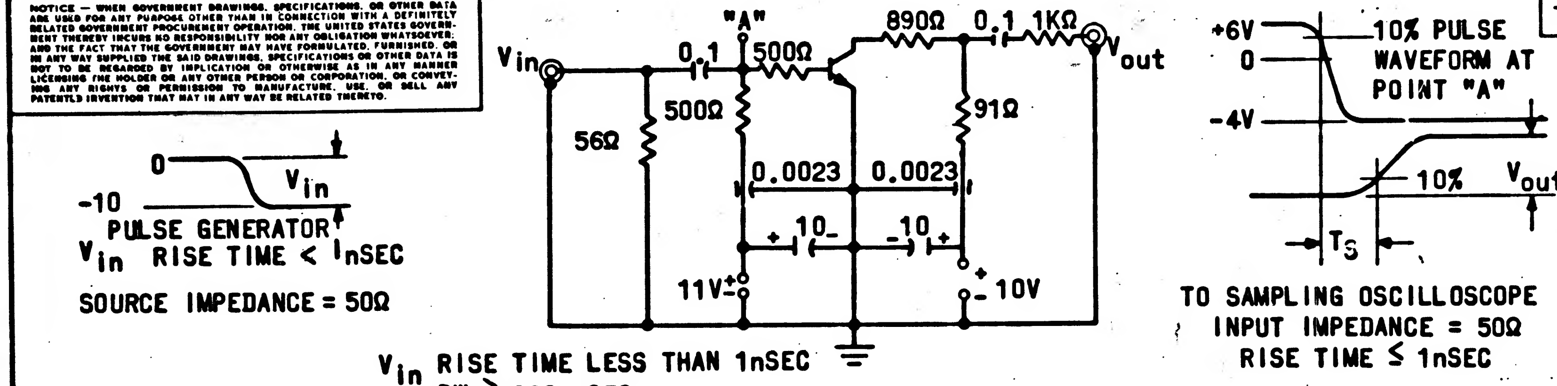
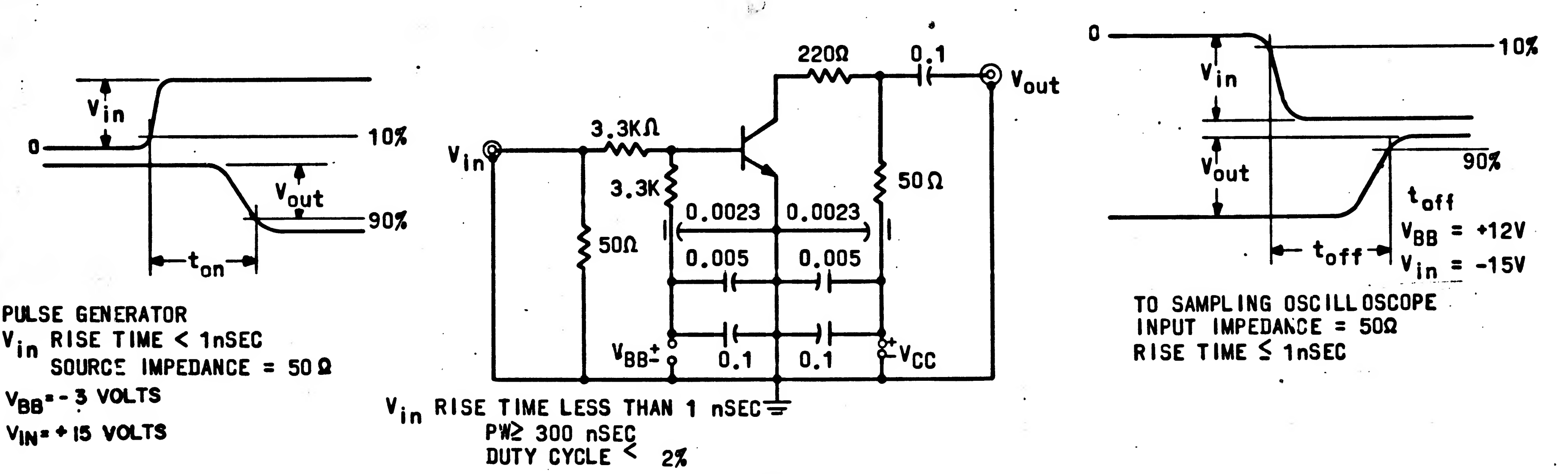


PULSE GENERATOR
V_{in} RISE TIME < 1nSEC
SOURCE IMPEDANCE = 50Ω

V_{in} RISE TIME LESS THAN 1nSEC
PW ≥ 300 nSEC
DUTY CYCLE < 2%

TO SAMPLING OSCILLOSCOPE
INPUT IMPEDANCE = 50Ω
RISE TIME ≤ 1nSEC

FIGURE 1



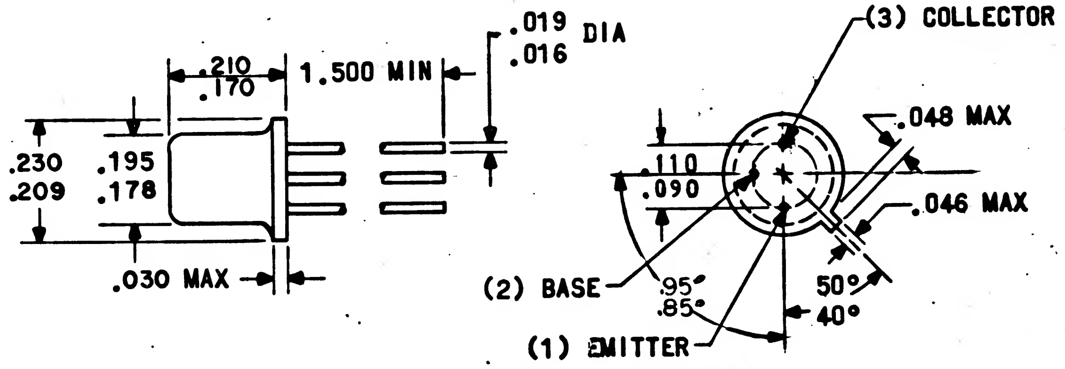
V_{BB} = +12V
V_{in} = -15V

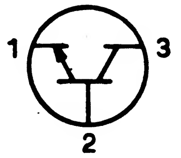
PULSE GENERATOR
V_{in} RISE TIME < 1nSEC
SOURCE IMPEDANCE = 50 Ω
V_{BB} = - 3 VOLTS
V_{IN} = + 15 VOLTS

V_{in} RISE TIME LESS THAN 1 nSEC
PW ≥ 300 nSEC
DUTY CYCLE < 2%

TO SAMPLING OSCILLOSCOPE
INPUT IMPEDANCE = 50Ω
RISE TIME ≤ 1nSEC

FIGURE 2





GRAPHICAL SYMBOL

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

—	—	—
SHEET 1	SHEET 2	SHEET 3

REVISION STATUS OF SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

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FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

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DRAWN J. Peterson DATE 30 SEP63
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APPROVAL D. R. Test for J. Atmos
APPROVAL
NASA APPROVAL 12/1/63
MIT APPROVAL W Kupfer 10Oct63

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010675
SCALE NONE
WT
SHEET 1 OF 3

INCHES 0 1 2
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1010675 —

REVISIONS 05141			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05141	10Dec63	wK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFROM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 1.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS OF ND 1002051, UNLESS MODIFIED OR AMENDED BY DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - D. UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-P-19491 LEVEL A.
   - E. UNITS SHALL BE IN ACCORDANCE WITH MIL-S-19500 IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) LEAD DATA: SHALL BE PER ND 1015402. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
     - (2) MARKING: THE MANUFACTURER'S NAME, TRADEMARK OR CODE; DATE CODE; NASA DRAWING NUMBER, WHICH SHALL CONSIST OF AT LEAST THE LAST THREE DIGITS; REVISION LETTER AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER MIL-STD-130. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-P-19491 AND SHALL INCLUDE THE NASA DRAWING NUMBER AND REVISION LETTER.
     - (3) MECHANICAL DIMENSIONS PER OUTLINE SHOWN.
   - B. ELECTRICAL REQUIREMENTS: PER TABLE II
     - (1) COLLECTOR CUTOFF CURRENT (I_{CBO3}) AT T_C=100°C
     - (2) SWITCHBACK VOLTAGE (LV_{CEO})
     - (3) COLLECTOR SATURATION VOLTAGE ($V_{CE(SAT)}$)
     - (4) BASE SATURATION VOLTAGE ($V_{BE(SAT)}$)
     - (5) STATIC FORWARD CURRENT TRANSFER RATIO (h_{FE1})
3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL RATINGS: PER TABLE I
   - B. ELECTRICAL CHARACTERISTICS: PER TABLE II
   - C. STORAGE TEMPERATURE: -65°C TO +200°C
   - D. OPERATING JUNCTION TEMPERATURE: 200°C MAX
   - E. POWER DISSIPATION TOTAL, 25°C CASE TEMPERATURE: 1.2 WATTS.
     - (1) DERATING: 146 DEGREES CENTIGRADE PER WATT
   - F. POWER DISSIPATION TOTAL, 25°C AMBIENT TEMPERATURE: 360 MILLIWATTS.
     - (1) DERATING: 486 DEGREES CENTIGRADE PER WATT.
   - G. LIFE TEST CONDITIONS FOR ND 1002051 ARE THE SAME AS THE BURN-IN CONDITIONS, EXCEPT T_J = 150° C.
   - H. SPECIAL CONDITIONING BY SUPPLIER:
     - (1) BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
       - a. AMBIENT TEMPERATURE: 25°C ±5°C
       - b. COLLECTOR VOLTAGE V_{CB}: 10VDC ±5%
       - c. POWER DISSIPATION: 165 MW ±10%
     - (2) THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
       - a. EMITTER CUTOFF CURRENT (I_{EBO}).
       - b. COLLECTOR CUTOFF CURRENT, I_{CBO}
       - c. COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$
       - d. STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1} (AT LOWEST SPECIFIED COLLECTOR CURRENT)
     - (3) THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF THE ABSOLUTE VALUE OF EACH CHARACTERISTIC AND TO SHOW THE FREQUENCY DISTRIBUTION OF THE PERCENT CHANGE OF EACH CHARACTERISTIC FROM ITS INITIAL READING. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN h_{FE}, OR HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} (THE ABSOLUTE INCREASE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.

TABLE I

MAXIMUM RATINGS AT T_C=25°C (UNLESS OTHERWISE SPECIFIED)

NASA PART NO.	COLLECTOR VOLTAGE (V_{CES})	COLLECTOR VOLTAGE (V_{CBO})	EMITTER VOLTAGE (V_{EBO})	COLLECTOR VOLTAGE (V_{CEO})	COLLECTOR CURRENT (I_C)	POWER DISSIPATION	EIA TYPE DESIGNATION (FOR REF ONLY)
1010675-1	VDC	VDC	VDC	VDC	MA	WATTS	2N2369
	40	40	5.0	17	500(PULSED)	1.2	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
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DWG. NO. CONTRACT 9-497
DRAWN F. Petersen DATE 30 SEP 63
CHECKED Ed Foster 20 Nov 63
APPROVAL D. R. Test for J. Sitomer
APPROVAL
NASA APPROVAL 12/11/63
MIT APPROVAL 10 Dec 63

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	C	1010675
SCALE NONE	WT	SHEET 2 OF 3

MASTER

INCHES
0 1 2
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—	1010675

REVISIONS 05141			
SYM.	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05141	1Dec63	WK

TABLE II

ELECTRICAL CHARACTERISTICS AT T_C = 25°C (UNLESS OTHERWISE SPECIFIED)

PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN.	LIMITS MAX.	UNITS
COLLECTOR CUT-OFF CURRENT	VCB=20V IE=0	$ICBO_1$	-	.4	uA
COLLECTOR CUT-OFF CURRENT	VCB=20V IE=0 TC=150°C	$ICBO_2$		70	uA
COLLECTOR CUT-OFF CURRENT	TC=100°C VCB=20V	$ICBO_3$	-	10	uA
EMITTER CUT-OFF CURRENT	V_{EB}= 4.5V IC=0	IEBO	-	10	uA
BREAKDOWN VOLTAGE, COLLECTOR TO BASE	IC=10uA IE=0	BVCBO	40	-	VOLTS
BREAKDOWN VOLTAGE, EMITTER TO BASE	IE=10uA IC=0	BVEBO	5.0	-	VOLTS
SWITCHBACK VOLTAGE	IC=10mA IB=0	LVCEO	17	-	VOLTS
COLLECTOR SATURATION VOLTAGE	IB=1mA IC=10mA	VCE(sat)	-	.25	VOLTS
BASE SATURATION VOLTAGE	IB=1mA IC=10mA	VBE(sat)	.7	.85	VOLT
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=1.0V IC=10mA	hFE_1	40	120	-
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=2.0V IC=100mA	hFE_2	20	-	-
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=1.0V IC=10mA T=-55°C	hFE_3	20	-	-
SMALL-SIGNAL, SHORT CIRCUIT FORWARD CURRENT TRANSFER RATIO	VCE=10V IC=10mA f=100mc	hfe	5	-	-
OUTPUT CAPACITANCE	VCB=[illegible] IE=0	Cob	-	4	uuf
INPUT CAPACITANCE	VEB=0.5V	Cib	-	4	uuf
CHANGE STORAGE TIME CONSTANT (SEE FIGURE 1)	$IC=IB_1=IB_2=$ 10mA	TS	-	13	n sec
TURN ON TIME (SEE FIGURE 2)	IC=10mA IB_1=3mA IB_2=1.5mA	Ton	-	12	n sec
TURN OFF TIME (SEE FIGURE 2)	IC=10mA IB_1=3mA IB_2=1.5mA	Toff	-	18	n sec

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DRAWN Patterson DATE 30 SEP 63
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APPROVAL
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SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	C	1010675
SCALE	WT	SHEET 3 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS			
-	INITIAL RELEASE CLASS A PER TDRR D4472	5Nov63	

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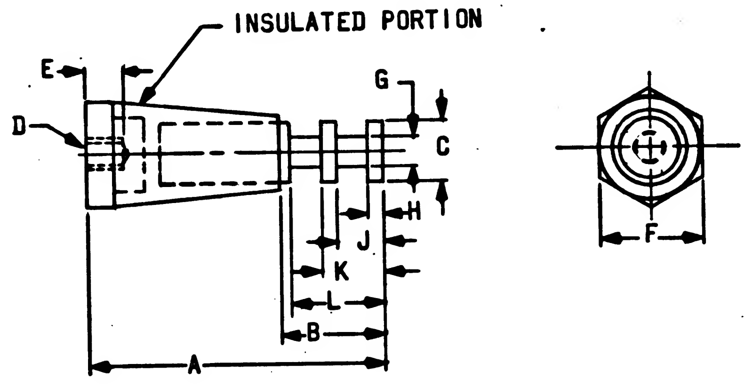
REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISION SPECIFIED IN ND 1015404, CLASS 3.
   - C. PER ALL REQUIREMENTS OF MIL-T-55155/20 EXCEPT FOR BASE FINISH REQUIREMENTS.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: BRASS PER COMPOSITION 22, HALF HARD OR COMPOSITION 24 OF SPEC. QQ-B-626. INSULATING MATERIAL, DIALLYL PHTHALATE TYPE SDG OF MIL-M-14 OR TYPE GDI-30 OF SPEC. MIL-M-19833.
     - (2) FINISH:
       - a. BASE: TINPLATED AND PRESERVED IN ACCORDANCE WITH SPEC. MIL-T-10727 OR NICKELPLATED IN ACCORDANCE WITH SPEC. QQ-N-290.
       - b. TERMINAL CONDUCTOR: TYPE 1 ELECTROLATED SOLDER (40 TO 60% TIN) PER SPEC. MIL-F-14072.
     - (3) DIMENSIONS: IN TABLE.
     - (4) MARKING:
       - a. PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:

         SUPPLIER'S NAME
         NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER.
         SUPPLIER'S LOT OR SERIAL NUMBER.
         DATE CODE, OR DATE OF MANUFACTURE.
       - b. MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.
3. APPLICATION DATA (FOR REFERENCE): DIELECTRIC WITHSTANDING VOLTAGE

ITEM		VOLTS AC(RMS)
1	ATMOSP	3,000
2	ATMOSP	6,000



NASA PART NUMBER	A	B	C DIA	D (UNC-2B) THD.	E	F	G DIA	H	J	K	L
1010676-1	0.718	0.343	0.149	NO. 4-40	0.156	0.250	0.062	0.031	0.125	0.156	0.312
1010676-2	0.937				0.218						

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

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TOLERANCES ON
FRACTIONS ± —— DECIMALS ± .005 ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

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DWG. NO.
CONTRACT NAS 9-497
DRAWN D. Dobbert DATE 21OCT63
CHECKED Ed Foster 23 OCT 63
APPROVAL Bert [illegible] 5 Nov 63
APPROVAL
NASA APPROVAL
MIT APPROVAL [illegible] 5Nov63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL , STUD (INSULATED),
STYLE SE 20

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010676
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010679

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 04242	10/30/63	wk.

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL:
   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
   C. EACH (CAN, JAR, TUBE, ETC.,) AND SHIPPING CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS, DATE OF MANUFACTURE.
2. ACCEPTANCE AND INSPECTION:
   A. COLOR: TRANSPARENT AMBER
   B. SPECIFIC GRAVITY: 0.95 - 0.99 MEASURED WITH A WESTPHAL BALANCE
3. DESIGN REQUIREMENTS:
   A. THE MATERIAL SHALL BE FURNISHED IN QUANTITIES SPECIFIED ON THE PURCHASE ORDER.
   B. MAY BE USED WITH RESIN PER NASA DRAWING 1010661.

PROCURE ONLY FROM APPROVED SOURCE LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
SEE REQUIREMENTS
HEAT TREATMENT
NONE
FINAL FINISH
NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO
CONTRACT NAS9-497

DRAWN E.W. Tuxaney DATE 4SEP63
CHECKED A. Urwick 5SEP63
APPROVAL John Hollenward 7OCT63
APPROVAL L.C. Smith 21 Oct. '63
NASA APPROVAL 10/30/63
MIT APPROVAL 30Oct63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ADHESIVE ACTIVATOR

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
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NASA DRAWING NO. 1010679
SCALE
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SHEET 1 OF 1

1010679

INCHES
0 1 2
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A | 1010683

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 06810	5 Mar 64	WK
A	REVISED PER TDRR 08519	5/26/64	WK.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. EACH UNIT AND SHIPPING CONTAINER OF MATERIAL SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS, AND DATE OF MANUFACTURE, LOT NUMBER AND EXPIRATION DATE FOR UNOPENED CONTAINERS.

2. ACCEPTANCE AND INSPECTION:
   - A. MATERIAL: THIS MATERIAL SHALL BE A LOW VISCOSITY AMINE-AMIDE TYPE CURING AGENT.
   - B. PROPERTIES:
     - (1) COLOR: THE COLOR OF THE MATERIAL SHALL BE AMBER.
     - (2) VISCOSITY: THE VISCOSITY SHALL BE 3,000 TO 14,000 CENTIPOISES AT 25° ± 1°C WHEN TESTED WITH A BROOKFIELD RVF SPINDLE NO. 5 AT 10 RPM WHEN USING A CONTAINER 3-1/2 INCHES IN DIAMETER AND WITH A LIQUID DEPTH OF 2-1/2 INCHES MINIMUM.
     - (3) SHEAR STRENGTH: WHEN MIXED AND CURED AS SPECIFIED IN 1010682 PARAGRAPH 3C, THE CURED MATERIAL SHALL COMPLY WITH THE SHEAR STRENGTH PROPERTIES SPECIFIED IN 1010682.

3. DESIGN REQUIREMENTS:
   - A. SHELF LIFE: THIS CURING AGENT SHALL HAVE A MINIMUM USABLE SHELF LIFE WHEN RECEIVED OF ONE YEAR WHEN STORED AT A MAXIMUM OF 75°F IN CLOSED CONTAINERS.
   - B. INTENDED USE: THIS MATERIAL IS INTENDED FOR USE IN CURING EPOXY ADHESIVES.

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497

DRAWN SPLANE DATE 1 NOV 63
CHECKED E. FOSTER 4 NOV 63
APPROVAL S. Smith (AY) 5 MAR 64
APPROVAL
NASA APPROVAL W. J. Rhine 3-5-64
MIT APPROVAL W 5 Mar 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CURING AGENT,
AMINE

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1010683
SCALE NONE | WT | SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 06810	5 Mar 64	WK
A	REVISED PER TDRR 08519	5/26/64	WK
B	REVISED PER TDRR 15577	1/26/65	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. EACH UNIT AND SHIPPING CONTAINER OF MATERIAL SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS, AND DATE OF MANUFACTURE, LOT NUMBER AND EXPIRATION DATE FOR UNOPENED CONTAINERS.

2. ACCEPTANCE AND INSPECTION:
   - A. MATERIAL: THIS MATERIAL SHALL BE A LOW VISCOSITY AMINE-AMIDE TYPE CURING AGENT.
   - B. PROPERTIES:
     - (1) COLOR: THE COLOR OF THE MATERIAL SHALL BE AMBER.
     - (2) VISCOSITY: THE VISCOSITY SHALL BE 2,000 TO 25,000 CENTIPOISES AT 25° ± 1°C WHEN TESTED WITH A BROOKFIELD RVF SPINDLE NO. 5 AT 10 RPM WHEN USING A CONTAINER 3-1/2 INCHES IN DIAMETER AND WITH A LIQUID DEPTH OF 2-1/2 INCHES MINIMUM.
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3. DESIGN REQUIREMENTS:
   - A. SHELF LIFE: THIS CURING AGENT SHALL HAVE A MINIMUM USABLE SHELF LIFE WHEN RECEIVED OF ONE YEAR WHEN STORED AT A MAXIMUM OF 75°F IN CLOSED CONTAINERS.
   - B. INTENDED USE: THIS MATERIAL IS INTENDED FOR USE IN CURING EPOXY ADHESIVES.

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TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
Contract NAS 9-497

DRAWN SPLANE DATE 1 NOV 63
CHECKED E. FOSTER 4 NOV 63
APPROVAL S. SMITH (AY) 5 MAR 64
APPROVAL
NASA APPROVAL W. J. Rhine 3-5-64
MIT APPROVAL W. Guf 5 Mar 64

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HOUSTON, TEXAS

CURING AGENT,
AMINE

SPECIFICATION CONTROL DRAWING

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NASA DRAWING NO. 1010683
SCALE NONE
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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 06810	5 Mar 64	WH

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   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
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2. ACCEPTANCE AND INSPECTION:
   - A. MATERIAL: THIS MATERIAL SHALL BE A LOW VISCOSITY AMINE-AMIDE TYPE CURING AGENT.
   - B. PROPERTIES:
     - (1) COLOR: THE COLOR OF THE MATERIAL SHALL BE AMBER.
     - (2) VISCOSITY: THE VISCOSITY SHALL BE 8,000 TO 20,000 CENTIPOISES AT 25° ± 1°C WHEN TESTED WITH A BROOKFIELD RVF SPINDLE NO. 5 AT 10 RPM WHEN USING A CONTAINER 3-1/2 INCHES IN DIAMETER AND WITH A LIQUID DEPTH OF 2-1/2 INCHES MINIMUM.
     - (3) SHEAR STRENGTH: WHEN MIXED AND CURED AS SPECIFIED IN 1010682 PARAGRAPH 3C, THE CURED MATERIAL SHALL COMPLY WITH THE SHEAR STRENGTH PROPERTIES SPECIFIED IN 1010682.

3. DESIGN REQUIREMENTS:
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MASTER

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LIST OF MATERIALS

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APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497

DRAWN SPLANE DATE 1 NOV 63
CHECKED E. FOSTER 4 NOV 63
APPROVAL S. SMITH (AY) 5 MAR 64
APPROVAL
NASA APPROVAL W. J. Rhine 3-5-64
MIT APPROVAL 5 Mar 64

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HOUSTON, TEXAS

CURING AGENT,
AMINE

SPECIFICATION CONTROL DRAWING

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SCALE NONE
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SHEET 1 OF 1

INCHES
0 1 2
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1010684 A

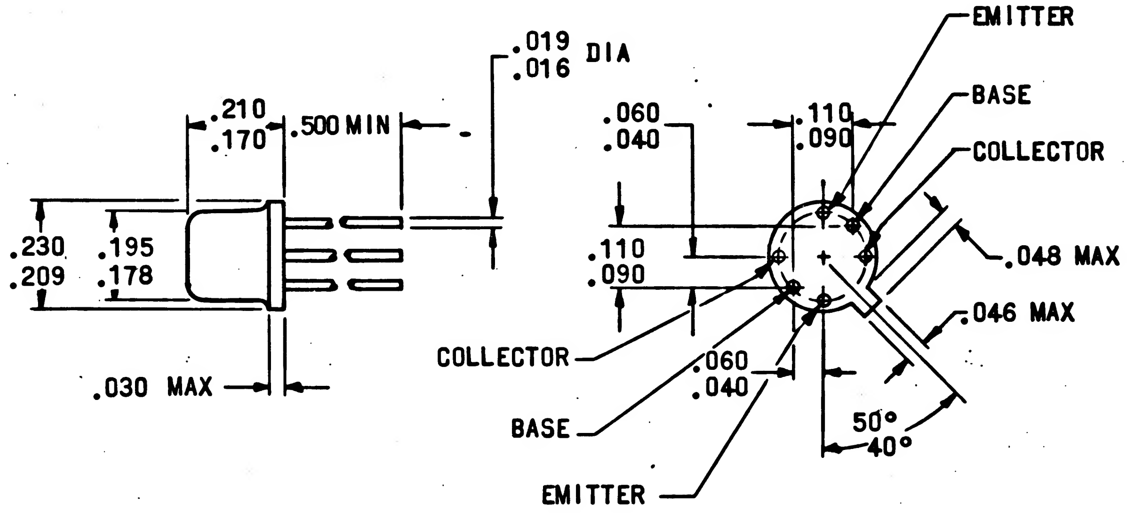
REVISIONS 05232			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 05232		WK
A	REVISED PER TDRR 11048	7/28/64	WK

Ⓜ

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. THE SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 1.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL THE QUALIFICATION REQUIREMENTS OF ND 1002051, UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - D. UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-S-19491, LEVEL A.
   - E. UNITS SHALL BE IN ACCORDANCE WITH MIL-S-19500 IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MARKING: THE NASA DRAWING NUMBER, WHICH SHALL CONSIST OF AT LEAST THE LAST THREE DIGITS, AND REVISION LETTER; AND THE MANUFACTURER'S NAME, TRADEMARK, OR CODE; DATE CODE; LOT CODE; AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND 1002019 MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-STD-129 AND SHALL INCLUDE THE NASA DRAWING NUMBER AND REVISION LETTER. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.
     - (2) LEAD DATA: KOVAR, WITH GOLD PLATING PER ND 1015402. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
   - B. ELECTRICAL REQUIREMENTS: PER TABLE II.
     - (1) COLLECTOR CUTOFF CURRENT, I_{CBO3} AT 100°C
     - (2) SWITCHBACK VOLTAGE, LV_{CEO}
     - (3) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}, h_{FE4}
     - (4) BASE SATURATION VOLTAGE, $V_{BE(SAT)}$
     - (5) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$, $V_{CE(SAT)2}$
3. DESIGN REQUIREMENTS:
   - A. STORAGE TEMPERATURE (Tstg): -65°C TO +200°C.
   - B. JUNCTION OPERATING TEMPERATURE (T_J): +200°C MAXIMUM.
   - C. ELECTRICAL RATINGS: PER TABLE I.
   - D. ELECTRICAL CHARACTERISTICS: PER TABLE II.
   - E. POWER DISSIPATION (EACH ELEMENT):
     - (1) AT 25°C AMBIENT TEMPERATURE: 300 MILLIWATTS MAXIMUM
       - a. DERATING: LINEAR TO +200°C
     - (2) AT 25°C CASE TEMPERATURE: .75 WATTS MAXIMUM.
       - a. DERATING: 4.3 MILLIWATTS PER DEGREE CENTIGRADE.
   - F. POWER DISSIPATION (DUAL DEVICE):
     - (1) AT 25°C AMBIENT TEMPERATURE: 400 MILLIWATTS MAXIMUM
       - a. DERATING: 2.3 MILLIWATTS PER °C
     - (2) AT 25°C CASE TEMPERATURE: 1.5 WATTS MAX
       - a. DERATING: 8.6 MILLIWATTS PER °C

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



A 1010684

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LIST OF MATERIALS			

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TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT NAS9-497

DRAWN Liermann DATE 1 OCT 63
CHECKED DIEHL 20 NOV. 63
APPROVAL G. MAYO 12-16-63
APPROVAL
NASA APPROVAL 12/17/63
MIT APPROVAL 17 Dec 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR, DUAL,
SILICON, NPN

SPECIFICATION CONTROL DRAWING

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—	C	1010684
SCALE NONE	WT	SHEET 1 OF 3

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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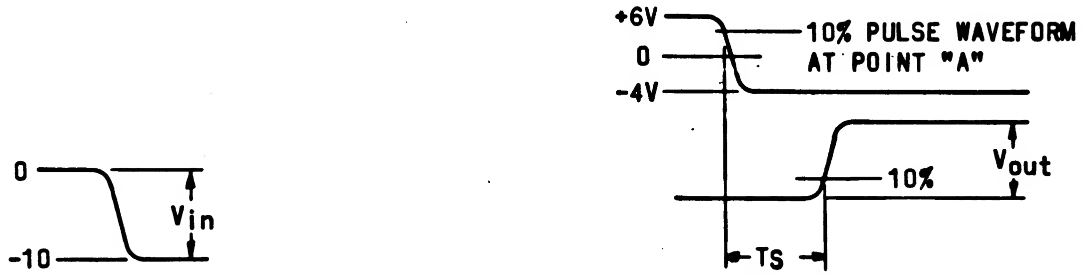
REVISIONS 05232

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 05232		WK
A	REVISED PER TDRR 11048	7/25/64	WK

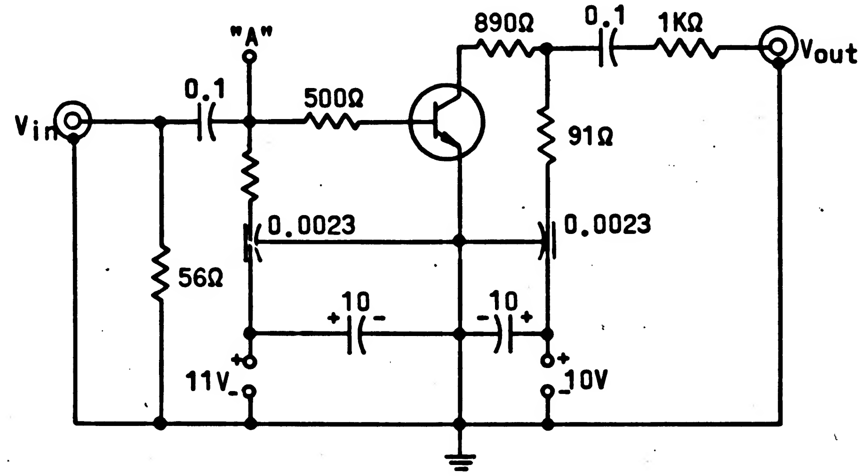
4. SPECIAL CONDITIONING BY SUPPLIER:
   A. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
      (1) AMBIENT TEMPERATURE: 25°C ± 5°C
      (2) COLLECTOR VOLTAGE V_{CB}: 10 VDC ±5% PER ELEMENT.
      (3) POWER DISSIPATION: 100 MW ±10% PER ELEMENT.
   B. THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
      (1) EMITTER CUTOFF CURRENT, I_{EBO}.
      (2) COLLECTOR CUTOFF CURRENT, I_{CBO}.
      (3) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)_1}$.
      (4) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE_1}.
   C. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF THE ABSOLUTE VALUE OF EACH CHARACTERISTIC AND TO SHOW THE FREQUENCY DISTRIBUTION OF THE PERCENT CHANGE OF EACH CHARACTERISTIC FROM ITS INITIAL READING. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN h_{FE}, OR HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} (THE ABSOLUTE CHANGE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.



PULSE GENERATOR
V_{in} RISE TIME < 1nsec
SOURCE IMPEDANCE = 50Ω

TO SAMPLING OSCILLOSCOPE
INPUT IMPEDANCE = 50Ω
RISE TIME ≤ 1 nsec

FIGURE I



V_{in} RISE TIME LESS THAN 1 nsec
PW ≥ 300 nsec
DUTY CYCLE < 2%

TABLE I

MAXIMUM RATINGS AT T_C = +25°C (UNLESS OTHERWISE SPECIFIED)

NASA PART NUMBER	COLLECTOR VOLTAGE (V_{CBO})	EMITTER VOLTAGE (V_{EBO})	COLLECTOR VOLTAGE (V_{CEO})	COLLECTOR CURRENT (I_C)	POWER DISSIPATION
	VDC	VDC	VDC	MA	WATTS
1010684–1	40	5.0	15	500	1.2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

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FINAL FINISH NONE

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INSTRUMENTATION LAB
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DRAWN Liermann DATE 1 OCT. 63
CHECKED [illegible] 3 OCT 63
APPROVAL G. MAYO 12-16-63
APPROVAL
NASA APPROVAL 12/17/63
MIT APPROVAL [illegible] Dec 63

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HOUSTON, TEXAS

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SILICON, NPN
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REVISIONS 05232

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A	REVISED PER TDRR 11048	7/28/64	WK

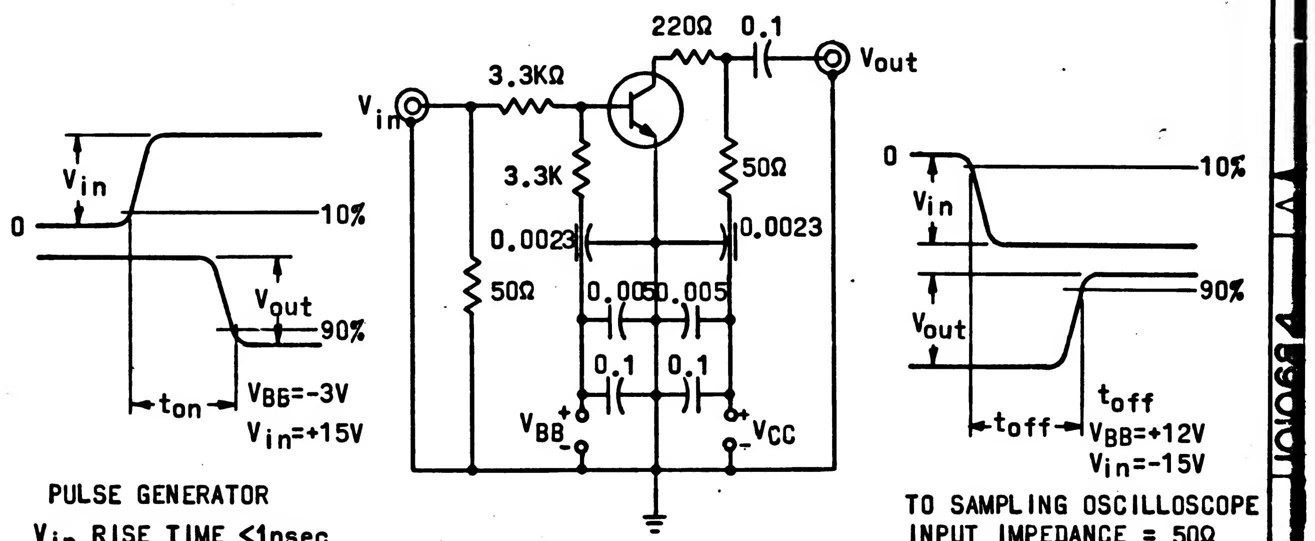
Ⓜ

TABLE II

ELECTRICAL CHARACTERISTICS AT TC = 25°C (UNLESS OTHERWISE SPECIFIED)

PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNITS
COLLECTOR CUT-OFF CURRENT	VCB=20V IE=0	$ICBO_1$	-	.4	uA
COLLECTOR CUT-OFF CURRENT	VCB=20V IE=0 TC=150°C	$ICBO_2$		70	uA
COLLECTOR CUT-OFF CURRENT	T_C=100°C V_{CB}=20V	$ICBO_3$	-	10	uA
EMITTER CUT-OFF CURRENT	V_{EB}=4.5V IC=0	IBEO	-	10	uA
BREAKDOWN VOLTAGE, COLLECTOR TO BASE	IC=10uA IE=0	BVCBO	40	-	VOLTS
BREAKDOWN VOLTAGE, EMITTER TO BASE	IE=10uA IC=0	BVEBO	5.0	-	VOLTS
SWITCHBACK VOLTAGE	IC=10ma IB=0	LVCEO	15	-	VOLTS
COLLECTOR SATURATION VOLTAGE	IB=1ma IC=10ma	$VCE(sat)_1$	-	.25	VOLTS
BASE SATURATION VOLTAGE	IB=1ma IC=10ma	VBE (sat)	.7	.85	VOLT
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=1.0V IC=10ma	hFE_1	40	120	-
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=2.0V IC=100ma	hFE_2	20	-	-
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=1.0V IC=10ma T= -55°C	hFE_3	20	-	-
SMALL-SIGNAL, SHORT CIRCUIT FORWARD CURRENT TRANSFER RATIO	VCE=10V IC=10ma f=100mc	hfe	5	-	-
OUTPUT CAPACITANCE	VCB=5V IE=0	Cob	-	4	uuf
INPUT CAPACITANCE	VEB=0.5V	Cib	-	4	uuf
CHARGE STORAGE TIME CONSTANT SEE FIGURE 1	$I_C=I_{B1}=I_{B2}$ =10ma	T_S	-	13	n sec
TURN ON TIME SEE FIGURE 2	I_C=10ma I_{B1}=3ma I_{B2}=1.5ma	T_{on}	-	12	n sec
TURN OFF TIME (SEE FIGURE 2)	I_C=10ma I_{B1}=3ma I_{B2}=1.5ma	T_{off}	-	18	n sec
COLLECTOR SATURATION VOLTAGE	I_B=10MA I_C=100MA	$V_{CE(SAT)_2}$		1.0	VOLTS
STATIC FORWARD CURRENT TRANSFER RATIO MATCH	V_{CE}=1.0V I_C=10MA	h_{FE4}	ELEMENTS OF DUAL UNIT SHALL BE MATCHED TO WITHIN 20% OF LOWER h_{FE} UNIT		

FIGURE 2



PULSE GENERATOR
V_{in} RISE TIME <1nsec
SOURCE IMPEDANCE = 50Ω

V_{in} RISE TIME LESS THAN 1nsec
PW ≥ 300 nsec
DUTY CYCLE < 2%

TO SAMPLING OSCILLOSCOPE
INPUT IMPEDANCE = 50Ω
RISE TIME ≤ 1nsec

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

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APPLICATION

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —   DECIMALS ± —   ANGLES ± —
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MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
NONE

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DRAWN Bermann DATE 1 OCT 63
CHECKED Walt Kaust 3 OCT 63
APPROVAL G. MAYO 12-16-63
APPROVAL
NASA APPROVAL 4/17/64
MIT APPROVAL 17 Dec 63

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010684
SCALE NONE
WT
SHEET 3 OF 3

MASTER

INCHES
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1010684 B

REVISIONS 05232

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 05232		WK
A	REVISED PER TDRR 11048	7/28/64	WK
B	REVISED PER TDRR 23178	11/9/65	WK

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

B. THE SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 1.

C. UNITS SHALL BE CAPABLE OF MEETING ALL THE QUALIFICATION REQUIREMENTS OF ND 1002051, UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.

D. PRESERVATION, PACKAGING, PACKING AND CONTAINER MARKING PER ND1002215, CLASS I, CODE 2.

2. INSPECTION AND ACCEPTANCE:

A. MECHANICAL REQUIREMENTS:

(1) MARKING: THE NASA DRAWING NUMBER (LAST THREE DIGITS REQUIRED), DASH NUMBER: AND THE MANUFACTURER'S NAME, TRADEMARK, OR CODE: DATE CODE: LOT CODE: AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND 1002019. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL INCLUDE THE NASA DRAWING NUMBER, THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

(2) LEAD DATA: KOVAR, WITH GOLD PLATING PER ND 1015402. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.

B. ELECTRICAL REQUIREMENTS: PER TABLE II.

(1) COLLECTOR CUTOFF CURRENT, I_{CBO3} AT 100°C

(2) SWITCHBACK VOLTAGE, LV_{CEO}

(3) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}, h_{FE4}

(4) BASE SATURATION VOLTAGE, $V_{BE(SAT)}$

(5) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$, $V_{CE(SAT)2}$

3. DESIGN REQUIREMENTS:

A. STORAGE TEMPERATURE (Tstg): -65°C TO +200°C.

B. JUNCTION OPERATING TEMPERATURE (T_J): +200°C MAXIMUM.

C. ELECTRICAL RATINGS: PER TABLE I.

D. ELECTRICAL CHARACTERISTICS: PER TABLE II.

E. POWER DISSIPATION (EACH ELEMENT):

(1) AT 25°C AMBIENT TEMPERATURE: 300 MILLIWATTS MAXIMUM

a. DERATING: LINEAR TO +200°C

(2) AT 25°C CASE TEMPERATURE: .75 WATTS MAXIMUM.

a. DERATING: 4.3 MILLIWATTS PER DEGREE CENTIGRADE.

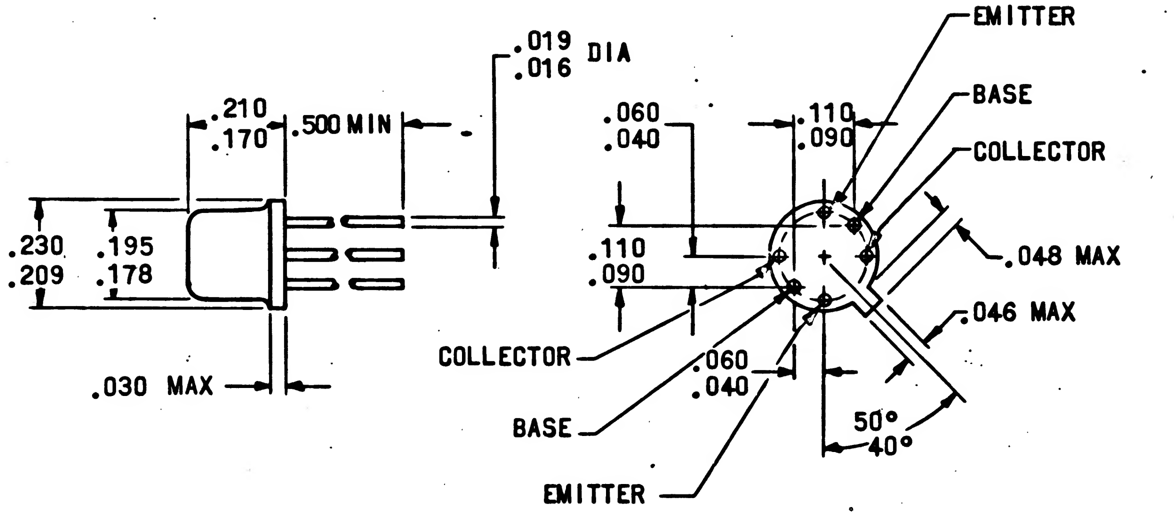
F. POWER DISSIPATION (DUAL DEVICE):

(1) AT 25°C AMBIENT TEMPERATURE: 400 MILLIWATTS MAXIMUM

a. DERATING: 2.3 MILLIWATTS PER °C

(2) AT 25°C CASE TEMPERATURE: 1.5 WATTS MAX

a. DERATING: 8.6 MILLIWATTS PER °C



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

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FRACTIONS ± — DECIMALS ± — ANGLES ± —
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MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

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CONTRACT NAS9-497

DRAWN Liermann DATE 1 Oct 63
CHECKED Diehl 20 Nov. 63
APPROVAL G. MAYO 12-11-63
APPROVAL
NASA APPROVAL 12/17/63
MIT APPROVAL 17 Dec 63

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010684
SCALE NONE
WT
SHEET 1 OF 3

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REVISIONS 05232			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 05232		WK
A	REVISED PER TDRR 11048	7/28/64	WK
B	REVISED PER TDRR 23178	11/9/65	WK

4. SPECIAL CONDITIONING BY SUPPLIER:

A. ALL UNITS SHALL HAVE SUCCESSFULLY PASSED THE FOLLOWING SCREENING TESTS PERFORMED DURING THE TIME INTERVAL BETWEEN FINAL SEAL AND THE 240 HOUR BURN-IN.

(1) ACCELERATION AT 20,000 G MINIMUM IN THE Y_1 ORIENTATION PER MIL-STD-750, METHOD 2006, OR IMPACT SHOCK AT 28K G MINIMUM IN THE Y_1 ORIENTATION.

(2) HELIUM LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION C, PROCEDURE III a OR b, A LEAK RATE OF 1 X 10^{-8} ATM CC/SEC OR GREATER SHALL CONSTITUTE A FAILURE.

(3) GROSS LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION A. GLYCERIN MAY BE USED IN LIEU OF MINERAL OIL.

B. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:

(1) AMBIENT TEMPERATURE: 25°C ± 5°C

(2) COLLECTOR VOLTAGE VCB: 10 VDC ±5% PER ELEMENT.

(3) POWER DISSIPATION: 100 MW ±10% PER ELEMENT.

C. THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:

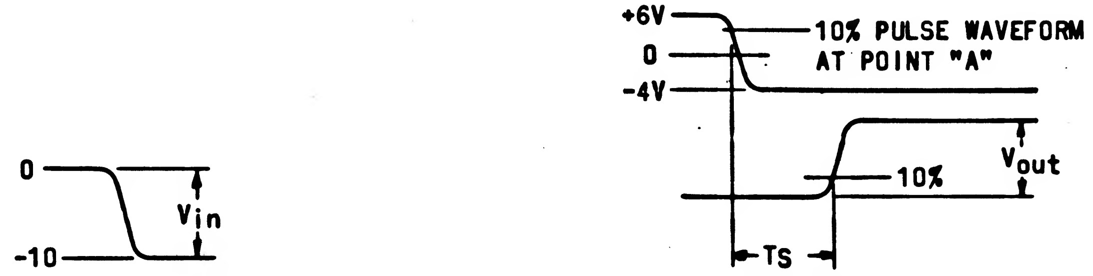
(1) EMITTER CUTOFF CURRENT, IEBO.

(2) COLLECTOR CUTOFF CURRENT, ICBO.

(3) COLLECTOR SATURATION VOLTAGE, VCE (SAT) $_1$.

(4) STATIC FORWARD CURRENT TRANSFER RATIO, HFE_1.

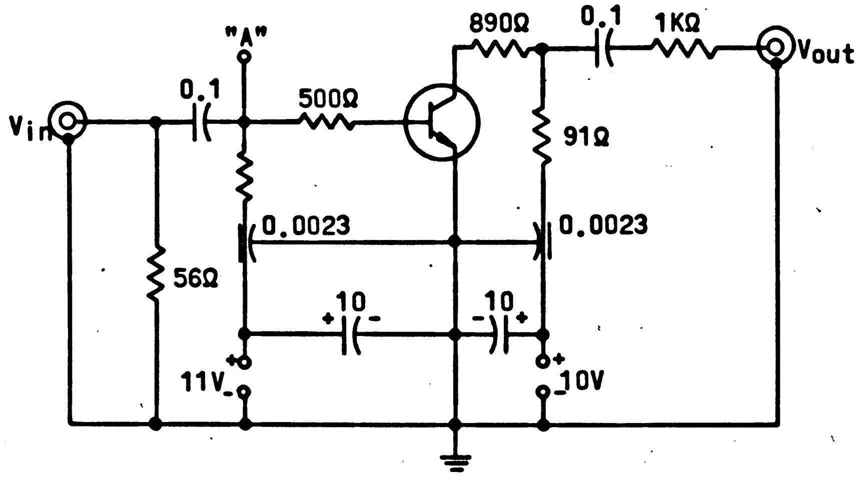
D. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING. THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN HFE, OR HAVING INCREASED MORE THAN 3 TIMES IN ICBO (THE ABSOLUTE CHANGE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.



PULSE GENERATOR
V_{in} RISE TIME < 1nsec
SOURCE IMPEDANCE = 50Ω

TO SAMPLING OSCILLOSCOPE
INPUT IMPEDANCE = 50Ω
RISE TIME ≤ 1 nsec

FIGURE I



V_{in} RISE TIME LESS THAN 1 nsec
PW ≥ 300 nsec
DUTY CYCLE < 2%

TABLE I

MAXIMUM RATINGS AT T_C = +25°C (UNLESS OTHERWISE SPECIFIED)

NASA PART NUMBER	COLLECTOR VOLTAGE (V_{CBO})	EMITTER VOLTAGE (V_{EBO})	COLLECTOR VOLTAGE (V_{CEO})	COLLECTOR CURRENT (I_C)	POWER DISSIPATION
	VDC	VDC	VDC	MA	WATTS
1010684-1	40	5.0	15	500	1.2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
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DO NOT SCALE THIS DRAWING
MATERIAL
SEE REQUIREMENTS
HEAT TREATMENT
NONE
FINAL FINISH
NONE

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CODE IDENT NO. 80230 SIZE C NASA DRAWING NO. 1010684
SCALE NONE WT SHEET 2 OF 3

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1010684 B

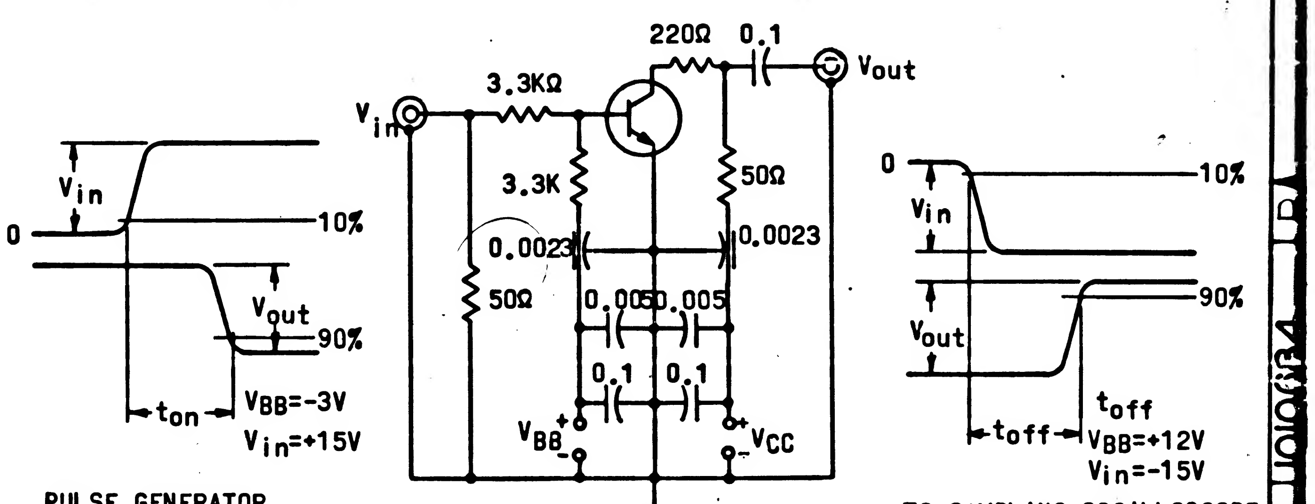
REVISIONS 05232			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 05232		WK
A	REVISED PER TDRR 11048	7/28/64	WK
B	REVISED PER TDRR 23178	11/5/68	WK

TABLE II

ELECTRICAL CHARACTERISTICS AT TC = 25°C (UNLESS OTHERWISE SPECIFIED)

PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNITS
COLLECTOR CUT-OFF CURRENT	VCB=20V IE=0	$ICBO_1$	-	.4	uA
COLLECTOR CUT-OFF CURRENT	VCB=20V IE=0 TC=150°C	$ICBO_2$		70	uA
COLLECTOR CUT-OFF CURRENT	T_C=100°C V_{CB}=20V	$ICBO_3$	-	10	uA
EMITTER CUT-OFF CURRENT	V_{EB}=4.5V IC=0	IBEO	-	10	uA
BREAKDOWN VOLTAGE, COLLECTOR TO BASE	IC=10uA IE=0	BVCBO	40	-	VOLTS
BREAKDOWN VOLTAGE, EMITTER TO BASE	IE=10uA IC=0	BVEBO	5.0	-	VOLTS
SWITCHBACK VOLTAGE	IC=10ma IB=0	LVCEO	15	-	VOLTS
COLLECTOR SATURATION VOLTAGE	IB=1ma IC=10ma	VCE $(sat)_1$	-	.25	VOLTS
BASE SATURATION VOLTAGE	IB=1ma IC=10ma	VBE (sat)	.7	.85	VOLT
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=1.0V IC=10ma	hFE_1	40	120	-
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=2.0V IC=100ma	hFE_2	20	-	-
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=1.0V IC=10ma T= -55°C	hFE_3	20	-	-
SMALL-SIGNAL, SHORT CIRCUIT FORWARD CURRENT TRANSFER RATIO	VCE=10V IC=10ma f=100mc	hfe	5	-	-
OUTPUT CAPACITANCE	VCB=5V IE=0	Cob	-	4	uuf
INPUT CAPACITANCE	VEB=0.5V	Cib	-	4	uuf
CHARGE STORAGE TIME CONSTANT SEE FIGURE 1	$I_C=I_{B1}=I_{B2}$ =10ma	T_S	-	13	n sec
TURN ON TIME SEE FIGURE 2	I_C=10ma I_{B1}=3ma I_{B2}=1.5ma	T_{on}	-	12	n sec
TURN OFF TIME (SEE FIGURE 2)	I_C=10ma I_{B1}=3ma I_{B2}=1.5ma	T_{off}	-	18	n sec
COLLECTOR SATURATION VOLTAGE	I_B=10MA I_C=100MA	$V_{CE(SAT)_2}$		1.0	VOLTS
STATIC FORWARD CURRENT TRANSFER RATIO MATCH	V_{CE}=1.0V I_C=10MA	h_{FE4}	ELEMENTS OF DUAL UNIT SHALL BE MATCHED TO WITHIN 20% OF LOWER h_{FE} UNIT		

FIGURE 2



PULSE GENERATOR
V_{in} RISE TIME <1nsec
SOURCE IMPEDANCE = 50Ω

V_{in} RISE TIME LESS THAN 1nsec
PW ≥ 300 nsec
DUTY CYCLE < 2%

TO SAMPLING OSCILLOSCOPE
INPUT IMPEDANCE = 50Ω
RISE TIME ≤ 1nsec

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

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UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

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APPROVAL
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MIT APPROVAL W Kupfer 17 Dec 63

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80230	C	1010684
SCALE NONE	WT	SHEET 3 OF 3

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REVISIONS

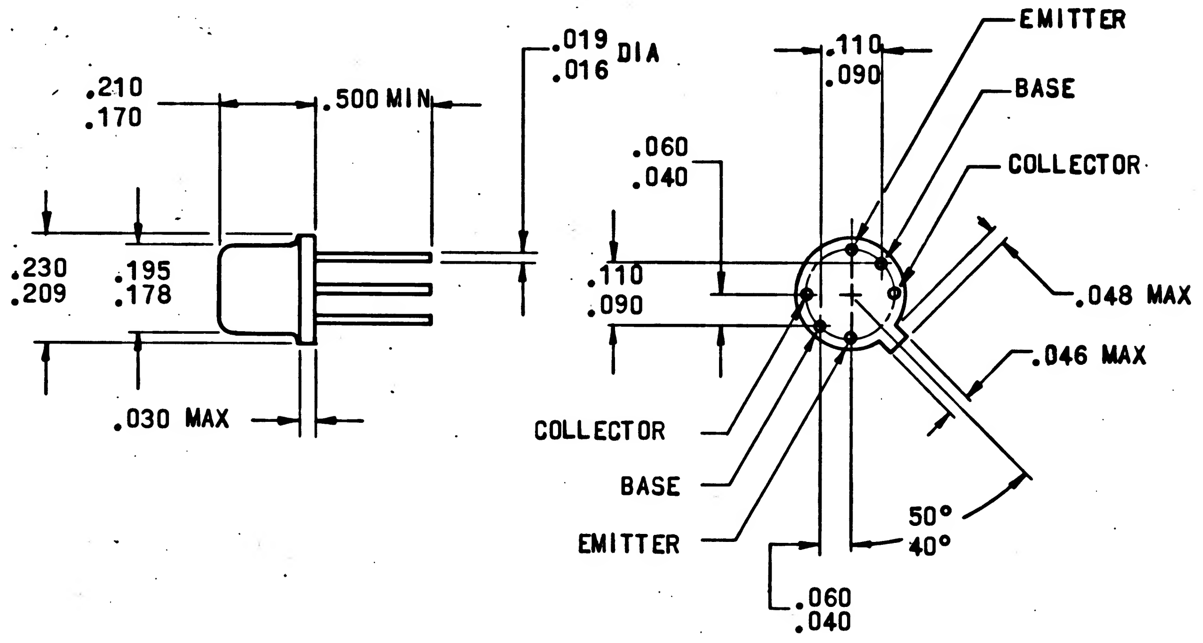
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	C	REPLACES REV B WITH CHANGE PER TDRR 32228	15 DEC 66	TK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. THE SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 1.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL THE QUALIFICATION REQUIREMENTS OF ND 1002051, UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - D. PRESERVATION, PACKAGING, PACKING AND CONTAINER MARKING PER ND 1002215, CLASS 1, CODE 2.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MARKING: THE NASA DRAWING NUMBER (LAST THREE DIGITS REQUIRED), DASH NUMBER: AND THE MANUFACTURER'S NAME, TRADEMARK, OR CODE: DATE CODE: LOT CODE: AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND 1002019. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL INCLUDE THE NASA DRAWING NUMBER, THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.
     - (2) LEAD DATA: KOVAR, WITH GOLD PLATING PER ND 1015402. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
   - B. ELECTRICAL REQUIREMENTS: PER TABLE II
     - (1) COLLECTOR CUTOFF CURRENT I_{CBO3} AT 100°C
     - (2) SWITCHBACK VOLTAGE, LV_{CEO}
     - (3) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}, h_{FE4}
     - (4) BASE SATURATION VOLTAGE, $V_{BE(SAT)}$
     - (5) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$, $V_{CE(SAT)2}$
   - C. ISOLATION CHECK:
     - (1) ALL SAMPLES SHALL BE SUBJECTED TO THE FOLLOWING INSPECTION.
     - (2) APPLY 300 VDC, THROUGH A 30 MEGOHM LIMITING RESISTOR, BETWEEN THE CASE AND ALL LEADS ELECTRICALLY TIED TOGETHER.
     - (3) THE RESULTING CURRENT SHALL NOT EXCEED 250 NANOAMPS.

3. DESIGN REQUIREMENTS:
   - A. STORAGE TEMPERATURE (Tstg): -65°C TO +200 °C.
   - B. JUNCTION OPERATING TEMPERATURE (T_J): +200°C MAXIMUM.
   - C. ELECTRICAL RATINGS: PER TABLE I.
   - D. ELECTRICAL CHARACTERISTICS: PER TABLE II.
   - E. POWER DISSIPATION (EACH ELEMENT):
     - (1) AT 25°C AMBIENT TEMPERATURE: 300 MILLIWATTS MAXIMUM.
       - a. DERATING: LINEAR TO +200°C
     - (2) AT 25°C CASE TEMPERATURE: .75 WATTS MAXIMUM.
       - a. DERATING: 4.3 MILLIWATTS PER DEGREE CENTIGRADE.



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UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS + −
3 PLACE DECIMALS + −
ANGLES + −
DO NOT SCALE THIS DRAWING
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CODE IDENT NO. 80230
1010684
SCALE −
SHEET 1 OF 3

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REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED
	C	REPLACES REV B WITH CHANGE PER TDRR 32228	15 DEC 66	TK

REQUIREMENTS: (CONTINUED)

F. POWER DISSIPATION (DUAL DEVICE):
  (1) AT 25°C AMBIENT TEMPERATURE: 400 MILLIWATTS MAXIMUM
    a. DERATING: 2.3 MILLIWATTS PER °C
  (2) AT 25°C CASE TEMPERATURE: 1.5 WATTS MAX
    a. DERATING: 8.6 MILLIWATTS PER °C

4. SPECIAL CONDITIONING BY SUPPLIER:

A. ALL UNITS SHALL HAVE SUCCESSFULLY PASSED THE FOLLOWING SCREENING TESTS PERFORMED DURING THE TIME INTERVAL BETWEEN FINAL SEAL AND THE 240 HOUR BURN-IN.
  (1) ACCELERATION AT 20,000 G MINIMUM IN THE Y_1 ORIENTATION PER MIL-STD-750, METHOD 2006, OR IMPACT SHOCK AT 28K G MINIMUM IN THE Y_1 ORIENTATION.
  (2) HELIUM LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION C, PROCEDURE IIIa OR b, A LEAK RATE OF 1×10^{-8} ATM CC/SEC OR GREATER SHALL CONSTITUTE A FAILURE.
  (3) GROSS LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION A. GLYCERIN MAY BE USED IN LIEU OF MINERAL OIL.

B. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
  (1) AMBIENT TEMPERATURE: 25°C ± 5°C
  (2) COLLECTOR VOLTAGE VCB: 10 VDC ± 5% PER ELEMENT.
  (3) POWER DISSIPATION: 100 MW ± 10% PER ELEMENT.

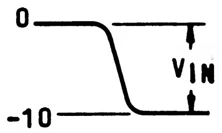
C. THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
  (1) EMITTER CUTOFF CURRENT, IEBO.
  (2) COLLECTOR CUTOFF CURRENT, ICBO.
  (3) COLLECTOR SATURATION VOLTAGE, $VCE\ (SAT)_1$.
  (4) STATIC FORWARD CURRENT TRANSFER RATIO, HFE_1.

D. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING. THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN HFE, OR HAVING INCREASED MORE THAN 3 TIMES IN ICBO (THE ABSOLUTE CHANGE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.

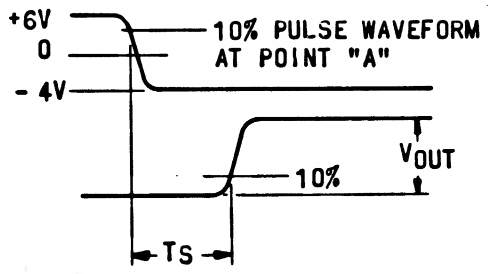
TABLE I

MAXIMUM RATINGS AT T_C = +25°C (UNLESS OTHERWISE SPECIFIED)

DASH NO.	COLLECTOR VOLTAGE (V_{CBO})	EMITTER VOLTAGE (V_{EBO})	COLLECTOR VOLTAGE (V_{CEO})	COLLECTOR CURRENT (I_C)	POWER DISSIPATION
-1	VDC	VDC	VDC	MA	WATTS
	40	5.0	15	500	1.2

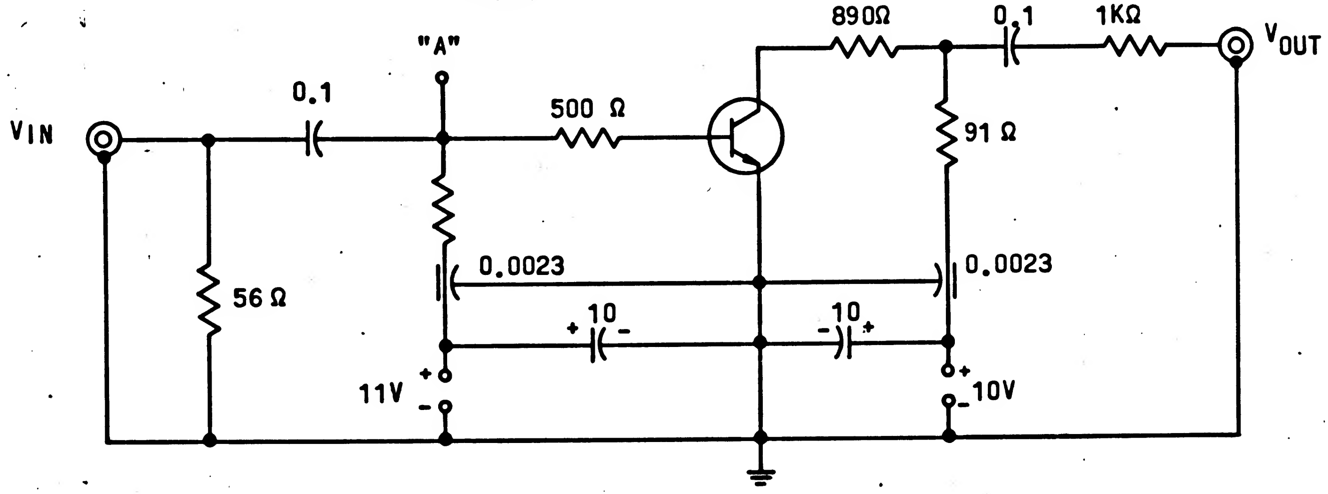


PULSE GENERATOR
V_{IN} RISE TIME < 1nsec
SOURCE IMPEDANCE=50Ω



TO SAMPLING OSCILLOSCOPE
INPUT IMPEDANCE = 50Ω
RISE TIME ≤ 1 nsec

FIGURE I



V_{IN} RISE TIME LESS THAN 1 nsec
PW ≥ 300 nsec
DUTY CYCLE < 2%

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
ANGLES ±

DO NOT SCALE THIS DRAWING

MATERIAL

APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN LIERMANN DATE 1 OCT 63
CHECKED MALIKOWSKI 3 OCT 63
APPROVAL G. MAYO 16 DEC 63
CONTRACT NAS 9-497
NASA APPROVAL W.L.S. 17 DEC 63
MIT APPROVAL W. KUPFER 17 DEC 63

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HOUSTON, TEXAS

TRANSISTOR, DUAL,
SILICON, NPN

SPECIFICATION CONTROL DRAWING

SIZE C
CODE IDENT NO. 80230
1010684
SCALE –
SHEET 2 OF 3

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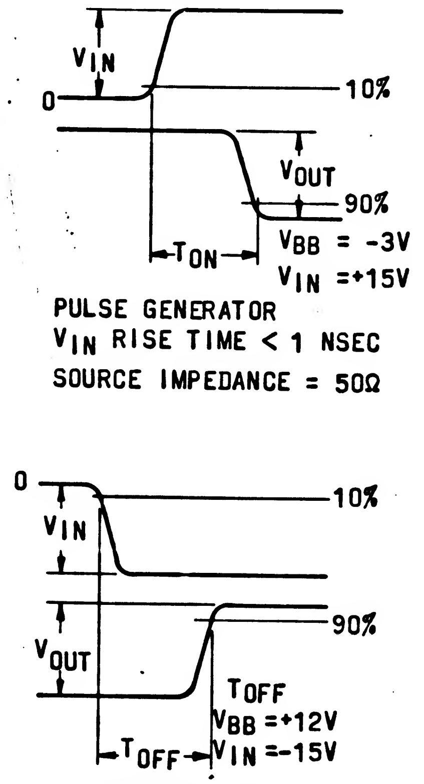
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	C	REPLACES REV B WITH CHANGE PER TDRR 32228	15 DEC 66	TK

TABLE II

ELECTRICAL CHARACTERISTICS AT TC = 25°C (UNLESS OTHERWISE SPECIFIED)

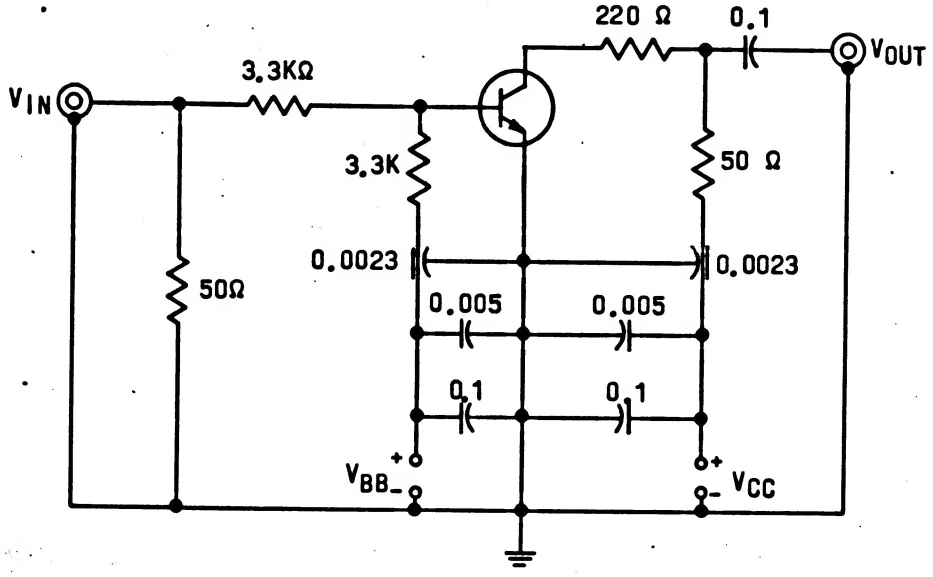
PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNITS
COLLECTOR CUT-OFF CURRENT	VCB=20V IE=0	$ICBO_1$	-	.4	uA
COLLECTOR CUT-OFF CURRENT	VCB=20V IE=0 TC=150°C	$ICBO_2$		70	uA
COLLECTOR CUT-OFF CURRENT	TC=100°C V_{CB}=20V	$ICBO_3$	-	10	uA
EMITTER CUT-OFF CURRENT	V_{EB}=4.5V IC=0	IBEO	-	10	muA
BREAKDOWN VOLTAGE, COLLECTOR TO BASE	IC=10uA IE=0	BVCBO	40	-	VOLTS
BREAKDOWN VOLTAGE, EMITTER TO BASE	IE=10uA IC=0	BVEBO	5.0	-	VOLTS
SWITCHBACK VOLTAGE	IC=10ma IB=0	LVCEO	15	-	VOLTS
COLLECTOR SATURATION VOLTAGE	IB=1ma IC=10ma	VCE (sat)1	-	.25	VOLTS
BASE SATURATION VOLTAGE	IB=1ma IC=10ma	VBE (sat)	.7	.85	VOLTS
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=1.0V IC=10ma	hFE_1	40	120	-
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=2.0V IC=100ma	hFE_2	20	-	-
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=1.0V IC=10ma T= -55°C	hFE_3	20	-	-
SMALL-SIGNAL, SHORT CIRCUIT FORWARD CURRENT TRANSFER RATIO	VCE=10V IC=10ma f=100mc	hfe	5	-	-
OUTPUT CAPACITANCE	VCB=5V IE=0	Cob	-	4	uuf
INPUT CAPACITANCE	VEB=0.5V	Cib	-	4	uuf
CHARGE STORAGE TIME CONSTANT SEE FIGURE 1	$I_C=I_{B1}=I_{B2}$ =10ma	T_S	-	13	n sec
TURN ON TIME SEE FIGURE 2	I_C=10ma I_{B1}=3ma I_{B2}=1.5ma	T_{on}	-	12	n sec
TURN OFF TIME (SEE FIGURE 2)	I_C=10ma I_{B1}=3ma I_{B2}=1.5ma	T_{off}	-	18	n sec
COLLECTOR SATURATION VOLTAGE	I_B=10MA I_C=100MA	$V_{CE(SAT)2}$		1.0	VOLTS
STATIC FORWARD CURRENT TRANSFER RATIO MATCH	V_{CE}=1.0V I_C=10MA	h_{FE4}	ELEMENTS OF DUAL UNIT SHALL BE MATCHED TO WITHIN 20% OF LOWER h_{FE} UNIT		



PULSE GENERATOR
V_{IN} RISE TIME < 1 NSEC
SOURCE IMPEDANCE = 50Ω

TO SAMPLING OSCILLOSCOPE
INPUT IMPEDANCE = 50Ω
RISE TIME ≤ 1 NSEC

FIGURE 2



V_{IN} RISE TIME LESS THAN 1 NSEC
PW ≥ 300 NSEC
DUTY CYCLE < 2%

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE DECIMALS + − 3 PLACE DECIMALS + − ANGLES + −	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS.	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	DRAWN LIERMANN DATE 1 OCT 63 CHECKED MALIKOWSKI 3 OCT 63 APPROVAL G. MAYO 16 DEC 63 CONTRACT NAS 9-497	TRANSISTOR, DUAL SILICON, NPN SPECIFICATION CONTROL DRAWING
DO NOT SCALE THIS DRAWING		
MATERIAL	NASA APPROVAL W.L.S. 17 DEC 63	SIZE C · CODE IDENT NO. 80230 · 1010684
APPROVAL	MIT APPROVAL W. KUPFER 17 DEC 63	SCALE — · SHEET 3 OF 3

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1010684

REVISIONS 05232

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 05232		WK

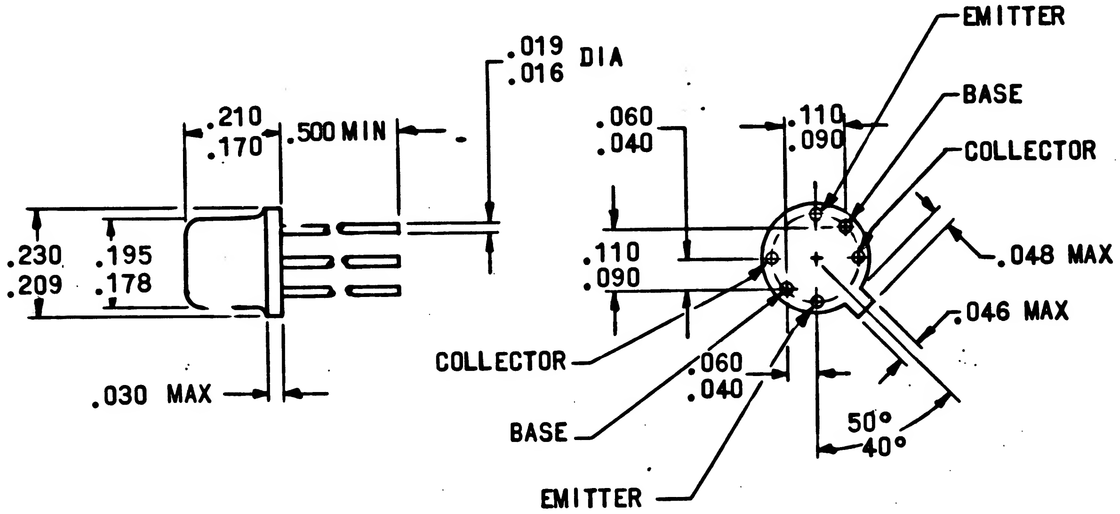
REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. THE SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 1.
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL THE QUALIFICATION REQUIREMENTS OF ND 1002051, UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - D. UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-P-19491, LEVEL A.
   - E. UNITS SHALL BE IN ACCORDANCE WITH MIL-S-19500 IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MARKING: THE NASA DRAWING NUMBER, WHICH SHALL CONSIST OF AT LEAST THE LAST THREE DIGITS, AND REVISION LETTER; AND THE MANUFACTURER'S NAME, TRADEMARK, OR CODE; DATE CODE; LOT CODE; AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER MIL-STD-130. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-P-19491 AND SHALL INCLUDE THE NASA DRAWING NUMBER AND REVISION LETTER. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.
     - (2) LEAD DATA: KOVAR, WITH GOLD PLATING PER ND 1015402. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
   - B. ELECTRICAL REQUIREMENTS: PER TABLE II.
     - (1) COLLECTOR CUTOFF CURRENT I_{CBO3} AT 100°C
     - (2) SWITCHBACK VOLTAGE, LV_{CEO}
     - (3) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}, h_{FE4}
     - (4) BASE SATURATION VOLTAGE, $V_{BE(SAT)}$
     - (5) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$, $V_{CE(SAT)2}$
3. DESIGN REQUIREMENTS:
   - A. STORAGE TEMPERATURE (Tstg): -65°C TO +200°C.
   - B. JUNCTION OPERATING TEMPERATURE (T_J): +200°C MAXIMUM.
   - C. ELECTRICAL RATINGS: PER TABLE I.
   - D. ELECTRICAL CHARACTERISTICS: PER TABLE II.
   - E. POWER DISSIPATION (EACH ELEMENT):
     - (1) AT 25°C AMBIENT TEMPERATURE: 300 MILLIWATTS MAXIMUM
       - a. DERATING: LINEAR TO +200°C
     - (2) AT 25°C CASE TEMPERATURE: .75 WATTS MAXIMUM.
       - a. DERATING: 4.3 MILLIWATTS PER DEGREE CENTIGRADE.
   - F. POWER DISSIPATION (DUAL DEVICE):
     - (1) AT 25°C AMBIENT TEMPERATURE: 400 MILLIWATTS MAXIMUM
       - a. DERATING: 2.3 MILLIWATTS PER °C
     - (2) AT 25°C CASE TEMPERATURE: 1.5 WATTS MAX
       - a. DERATING: 8.6 MILLIWATTS PER °C

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

SHEET 1	SHEET 2	SHEET 3
REVISION STATUS OF SHEETS		



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

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CAMBRIDGE, MASS.
DWG. NO. CONTRACT NAS9-497
DRAWN Liermann DATE 1 Oct 63
CHECKED DIEHL 20 Nov. 63
APPROVAL G. MAYO 12-11-63
APPROVAL
NASA APPROVAL 12/17/63
MIT APPROVAL 17 Dec 63

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO. — SIZE C NASA DRAWING NO. 1010684
SCALE NONE WT SHEET 1 OF 3

INCHES
0 1 2
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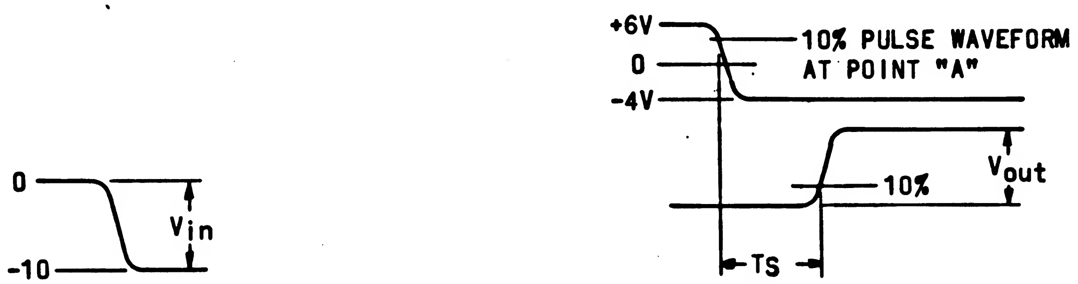
REVISIONS 05232			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 05232		WK

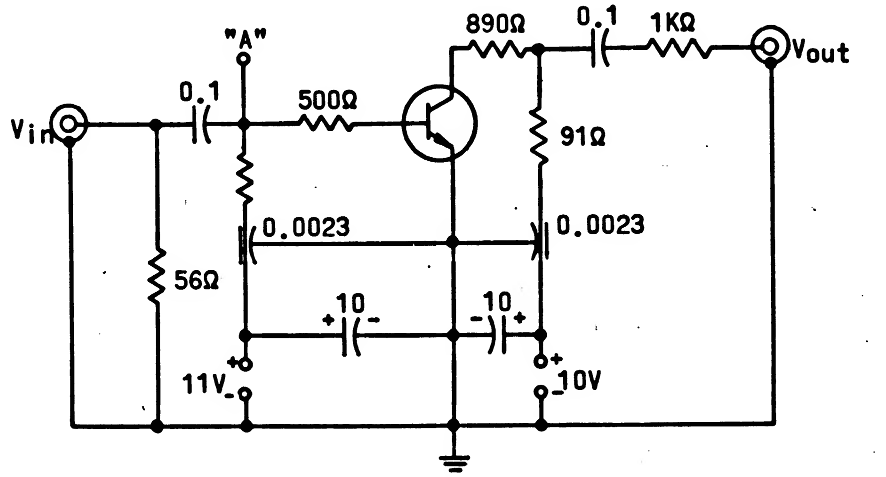
4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
     - (1) AMBIENT TEMPERATURE: 25°C ± 5°C
     - (2) COLLECTOR VOLTAGE V_{CB}: 10 VDC ±5% PER ELEMENT.
     - (3) POWER DISSIPATION: 100 MW ±10% PER ELEMENT.
   - B. THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
     - (1) EMITTER CUTOFF CURRENT, I_{EBO}.
     - (2) COLLECTOR CUTOFF CURRENT, I_{CBO}.
     - (3) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)_1}$.
     - (4) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE_1}.
   - C. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF THE ABSOLUTE VALUE OF EACH CHARACTERISTIC AND TO SHOW THE FREQUENCY DISTRIBUTION OF THE PERCENT CHANGE OF EACH CHARACTERISTIC FROM ITS INITIAL READING. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN h_{FE}, OR HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} (THE ABSOLUTE CHANGE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.



PULSE GENERATOR
V_{in} RISE TIME < 1nsec
SOURCE IMPEDANCE = 50Ω

TO SAMPLING OSCILLOSCOPE
INPUT IMPEDANCE = 50Ω
RISE TIME ≤ 1 nsec

FIGURE I



V_{in} RISE TIME LESS THAN 1 nsec
PW ≥ 300 nsec
DUTY CYCLE < 2%

TABLE I

MAXIMUM RATINGS AT T_C = +25°C (UNLESS OTHERWISE SPECIFIED)

NASA PART NUMBER	COLLECTOR VOLTAGE (V_{CBO})	EMITTER VOLTAGE (V_{EBO})	COLLECTOR VOLTAGE (V_{CEO})	COLLECTOR CURRENT (I_C)	POWER DISSIPATION	EIA TYPE DESIGNATION (FOR REF. ONLY)
	VDC	VDC	VDC	MA	WATTS	
1010684-1	40	5.0	15	500	1.2	2N2369

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

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DWG. NO
CONTRACT NAS 9-497
DRAWN Liermann DATE 1 OCT 63
CHECKED Wale Kaushe 30 OCT 63
APPROVAL G. MAYO 12-16-63
APPROVAL
NASA APPROVAL 12/17/63
MIT APPROVAL

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SILICON, NPN
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010684
SCALE NONE
WT
SHEET 2 OF 3

MASTER

INCHES
0 1 2
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1010684

REVISIONS 05232

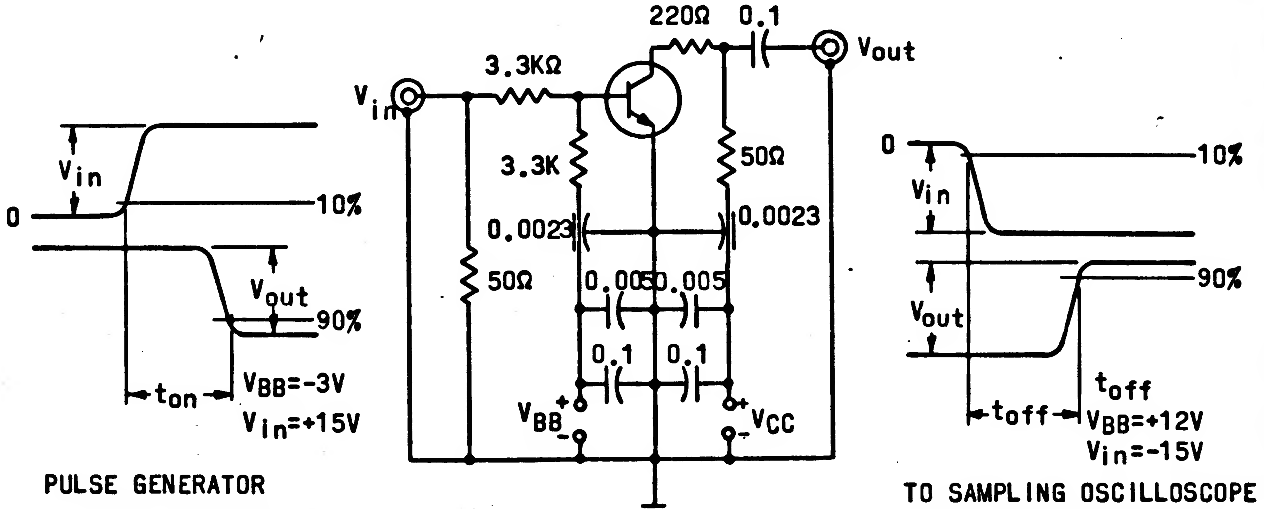
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 05232		WK

TABLE II

ELECTRICAL CHARACTERISTICS AT TC = 25°C (UNLESS OTHERWISE SPECIFIED)

PARAMETER	TEST CONDITIONS	SYMBOL	LIMITS		UNITS
			MIN	MAX	
COLLECTOR CUT-OFF CURRENT	VCB=20V IE=0	$ICBO_1$	-	.4	uA
COLLECTOR CUT-OFF CURRENT	VCB=20V IE=0 TC=150°C	$ICBO_2$		70	uA
COLLECTOR CUT-OFF CURRENT	T_C=100°C V_{CB}=20V	$ICBO_3$	-	10	uA
EMITTER CUT-OFF CURRENT	V_{EB} =4.5V IC=0	IBEO	-	10	uA
BREAKDOWN VOLTAGE, COLLECTOR TO BASE	IC=10uA IE=0	BVCBO	40	-	VOLTS
BREAKDOWN VOLTAGE, EMITTER TO BASE	IE=10uA IC=0	BVEBO	5.0	-	VOLTS
SWITCHBACK VOLTAGE	IC=10ma IB=0	LVCEO	15	-	VOLTS
COLLECTOR SATURATION VOLTAGE	IB=1ma IC=10ma	$VCE\ (sat)_1$	-	.25	VOLTS
BASE SATURATION VOLTAGE	IB=1ma IC=10ma	VBE (sat)	.7	.85	VOLT
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=1.0V IC=10ma	hFE_1	40	120	-
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=2.0V IC=100ma	hFE_2	20	-	-
STATIC FORWARD CURRENT TRANSFER RATIO	VCE=1.0V IC=10ma T= -55°C	hFE_3	20	-	-
SMALL-SIGNAL, SHORT CIRCUIT FORWARD CURRENT TRANSFER RATIO	VCE=10V IC=10ma f=100mc	hfe	5	-	-
OUTPUT CAPACITANCE	VCB=5V IE=0	Cob	-	4	uuf
INPUT CAPACITANCE	VEB=0.5V	Cib	-	4	uuf
CHARGE STORAGE TIME CONSTANT SEE FIGURE 1	$I_C=I_{B1}=I_{B2}$ =10ma	T_S	-	13	n sec
TURN ON TIME SEE FIGURE 2	I_C=10ma I_{B1}=3ma I_{B2}=1.5ma	T_{on}	-	12	n sec
TURN OFF TIME (SEE FIGURE 2)	I_C=10ma I_{B1}=3ma I_{B2}=1.5ma	T_{off}	-	18	n sec
COLLECTOR SATURATION VOLTAGE	I_B=IOMA I_C=IOOMA	$V_{CE(SAT)_2}$		1.0	VOLTS
STATIC FORWARD CURRENT TRANSFER RATIO MATCH	V_{CE}=1.0V I_C=IOMA	h_{FE4}	ELEMENTS OF DUAL UNIT SHALL BE MATCHED TO WITHIN 20% OF LOWER h_{FE} UNIT		

FIGURE 2



PULSE GENERATOR
V_{in} RISE TIME <1nsec
SOURCE IMPEDANCE = 50Ω

V_{in} RISE TIME LESS THAN 1nsec
PW ≥ 300 nsec
DUTY CYCLE < 2%

TO SAMPLING OSCILLOSCOPE
INPUT IMPEDANCE = 50Ω
RISE TIME ≤ 1nsec

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
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CAMBRIDGE, MASS
DWG. NO. CONTRACT NAS 9-497
DRAWN Bermann DATE 1 OCT 63
CHECKED Rawsha 3 OCT 63
APPROVAL G. MAYO 12-16-63
APPROVAL
NASA APPROVAL 12/17/63
MIT APPROVAL 17 Dec 63

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SILICON, NPN

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010684
SCALE NONE
WT
SHEET 3 OF 3

INCHES
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1010685

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05616	7 Jan 64	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 3.
   - C. EACH SPOOL AND SHIPPING CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS, AND DATE OF MANUFACTURE.
2. ACCEPTANCE AND INSPECTION REQUIREMENTS:
   - A. THIS WIRE SHALL MEET THE REQUIREMENTS OF ND1002105.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN Lu S Alowe DATE 1-6-64
CHECKED A Marto 1-6-64
APPROVAL By R G. MAYO 1-7-64
APPROVAL
NASA APPROVAL
MIT APPROVAL W Kupfer 7 Jan 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STRANDED COPPER WIRE
IRRADIATED POLYOLEFIN INSULATED
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010685
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010685

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05616	7 Jan 64	WK

NASA PART NUMBER	AWG SIZE PER COND	NO OF STRDS	STRD SIZE	MAX COND DIA	MAX. COND RES/1000 AT 20°C	INSULATION O. D. MIN	INSULATION O. D. MAX	INSULATION COLOR	NO. OF COND	SHIELD DIMS STRD AWG	SHIELD DIMS DIA OVER SHIELD	JACKET O.D.	JACKET COLOR	TYPE (ND1002105)
1010685-1	24	19	36	0.027	25.38	.040	.047	WHITE	1	—	—	—	—	I
-2	22	↓	34	0.033	15.98	.046	.054	↓	1	—	—	—	—	I
-3	16	↓	29	0.061	4.95	.078	.086	↓	1	—	—	—	—	I
-4	24	↓	36	0.027	25.38	.040	.047	↓	1	36	.065/.072	.080/.102	WHITE	VI
-5	↓	↓	↓	↓	↓	↓	↓	WHITE RED	2	36	.105/.119	.126/.155	↓	VII
-6	↓	↓	↓	↓	↓	↓	↓	WHITE RED BLUE	3	36	.105/.119	.126/.155	↓	VII
-7	↓	↓	↓	↓	↓	↓	↓	BLUE BROWN	2	36	.105/.119	.126/.155	↓	VII

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
SEE REQUIREMENTS
HEAT TREATMENT —
FINAL FINISH —

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

-LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN Louis A Court DATE JAN 6, 64
CHECKED A. Mats 1-6-64
APPROVAL 1-7-64
APPROVAL
NASA APPROVAL Bernard
MIT APPROVAL W Kupfer 7 Jan 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STRANDED COPPER WIRE
IRRADIATED POLYOLEFIN INSULATED
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010685
SCALE NONE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010686 A

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05619	1/7/64	
A	REVISED PER TDRR 06195		WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
   - C. EACH SHIPPING AND UNIT CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER, AND REVISION LETTER, NET CONTENTS, LOT NUMBER, DATE OF MANUFACTURE, AND EXPIRATION DATE FOR UNOPENED CONTAINERS.

2. INSPECTION AND ACCEPTANCE:
   - A. MATERIAL: LIQUID CATALYST
   - B. COLOR: CLEAR
   - C. VISCOSITY: 18,000 TO 32,000 CENTIPOISES AT 25 ± 2°C WHEN TESTED IN ACCORDANCE WITH ASTM-D-1824 EXCEPT BROOKFIELD VISCOMETER MODEL RVT SHALL BE USED WITH A NO. 6 SPINDLE AT 10 RPM.
   - D. PROPERTIES: WHEN MIXED AND CONDITIONED AS SPECIFIED IN 1010657, SECTION 2B, THIS MATERIAL SHALL BE CAPABLE OF PROVIDING THE CURE AND POT LIFE PROPERTIES SPECIFIED IN 1010657.

3. DESIGN REQUIREMENTS:
   - A. SHELF LIFE: WHEN STORED AT BELOW 80°F IN SEALED CONTAINERS THIS MATERIAL SHALL HAVE A MINIMUM OF 9 MONTHS USABLE SHELF LIFE WHEN RECEIVED.
   - B. INTENDED USE: THIS MATERIAL IS INTENDED FOR USE AS A CATALYST FOR CURING EPOXY BONDING RESIN 1010657.
   - C. CURED MATERIAL: WHEN MIXED AND CURED AS SPECIFIED IN 1010657, SECTION 3C, THIS MATERIAL SHALL BE CAPABLE OF IMPARTING THE DIELECTRIC AND SHEAR STRENGTH PROPERTIES SPECIFIED IN 1010657.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —   DECIMALS ± —   ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO Contract NAS 9-497
DRAWN PATTERSON DATE 21-OCT-63
CHECKED WILSON 23-OCT-63
APPROVAL L. C. Smith 1-7-64
APPROVAL
NASA APPROVAL
MIT APPROVAL W Kupfer 7 Jan 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CATALYST
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. — SIZE C NASA DRAWING NO. 1010686
SCALE NONE WT SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

— 9890101

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05619	1/7/64	

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
   - C. EACH SHIPPING AND UNIT CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER, AND REVISION LETTER, NET CONTENTS, LOT NUMBER, DATE OF MANUFACTURE, AND EXPIRATION DATE FOR UNOPENED CONTAINERS.

2. INSPECTION AND ACCEPTANCE:
   - A. MATERIAL: LIQUID CATALYST
   - B. COLOR: CLEAR
   - C. VISCOSITY: 18,000 TO 32,000 CENTIPOISES AT 23°C WHEN TESTED IN ACCORDANCE WITH ASTM-D-1824 EXCEPT BROOKFIELD VISCOMETER MODEL RVT SHALL BE USED WITH A NO. 6 SPINDLE AT 10 RPM.
   - D. PROPERTIES: WHEN MIXED AND CONDITIONED AS SPECIFIED IN 1010657, SECTION 2B, THIS MATERIAL SHALL BE CAPABLE OF PROVIDING THE CURE AND POT LIFE PROPERTIES SPECIFIED IN 1010657.

3. DESIGN REQUIREMENTS:
   - A. SHELF LIFE: WHEN STORED AT BELOW 80°F IN SEALED CONTAINERS THIS MATERIAL SHALL HAVE A MINIMUM OF 9 MONTHS USABLE SHELF LIFE WHEN RECEIVED.
   - B. INTENDED USE: THIS MATERIAL IS INTENDED FOR USE AS A CATALYST FOR CURING EPOXY BONDING RESIN 1010657.
   - C. CURED MATERIAL: WHEN MIXED AND CURED AS SPECIFIED IN 1010657, SECTION 3C, THIS MATERIAL SHALL BE CAPABLE OF IMPARTING THE DIELECTRIC AND SHEAR STRENGTH PROPERTIES SPECIFIED IN 1010657.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO Contract NAS 9-497
DRAWN PATTERSON DATE 21-OCT-63
CHECKED WILSON 23-OCT-63
APPROVAL S. C. Smith 1-7-64
APPROVAL
NASA APPROVAL
MIT APPROVAL W Kupfer 7 Jan 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CATALYST

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. — SIZE C NASA DRAWING NO. 1010686
SCALE NONE WT SHEET 1 OF 1

1010686 —

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

A 1010688

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04472	5Nov63	WK
A	REVISED PER TDRR 04698	19 Nov 63	

Ⓜ

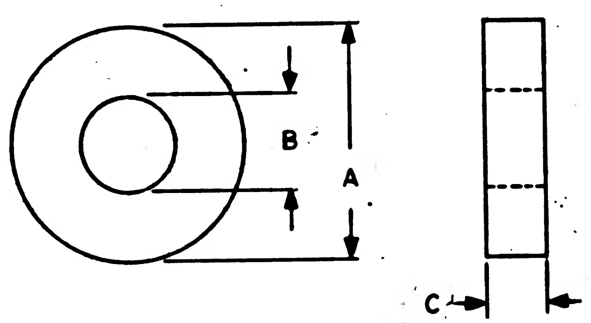
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN SPECIFICATION ND 1015404, CLASS 3.
2. INSPECTION AND ACCEPTANCE:
   - A. MARKING: TAG PER ND 1002019 AND MARK PERMANENTLY AND LEGIBLY WITH THE NASA PART NUMBER AND REVISION LETTER, AND THE MANUFACTURER'S NAME OR SYMBOL. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE TAG OR PACKAGE. ALSO COLOR CODE, PER TABLE I, EACH CORE WITH TWO DOTS. MINIMUM DOT DIAMETER 1/8".
   - B. UNIT SHALL MEET REQUIREMENTS OF TABLE I.
3. DESIGN REQUIREMENTS:
   - A. TYPE OF CORE: TAPE WOUND ON STAINLESS STEEL BOBBIN.
   - B. TAPE THICKNESS: 0.001"
   - C. MATERIAL: SQUARE PERMALLOY 80 OR EQUIVALENT (79% NICKEL IRON)
   - D. CORE SIZE (FOR REFERENCE): O.D. = 0.345, I.D. 0.250, TAPE WIDTH = 0.125
   - E. MEAN CORE LENGTH (REFERENCE): 2.30 CENTIMETERS

TABLE I PARAMETERS (NOTE: 1 AND 2)

B_M MAXIMUM FLUX DENSITY	B_M-B_R DIFFERENTIAL FLUX DENSITY	A_C EFFECTIVE CORE AREA (FOR REF.)	B_2-B_1 CORE GAIN FLUX DENSITY RANGE	400 CPS TEST FREQUENCY			DIMENSIONS			COLOR CD.	DASH NO.
				H_C MAGNETIC INTENSITY FOR $B_M/2$ RESET	H_R MAGNETIC INTENSITY FOR B_2-B_1 RESET	FLUX CAPACITY (FOR REF.)	A MAX	B MIN	C MAX		
KILOGAUSSES	KILOGAUSSES	SQ. CM.	KILOGAUSSES	OERSTED	OERSTED	MAXWELLS					
6.9-7.9	0.02-20 B_M	0.02	5.0	0.024-0.048	.0035-.0070	300	.379	.218	.175	BR-BR	1010688-1
6.9-7.9	0.02-0.20B_M	0.0140	5.0	0.024-0.048	0.004-0.008	210	.410	.220	.100	RED-RED	1010688-2



NOTE 1: ALL MAGNETIC CORE PARAMETERS DESIGNATED ARE FOR SINUSOIDAL CURRENT EXCITATION AND CONSTANT RESET TESTING PER AIEE STANDARD CORE TEST METHOD PAPER NO. 432

NOTE 2: IN ANY PARTICULAR SHIPMENT OF CORES THE VALUE OF EACH PARAMETER TESTED SHALL BE SUCH THAT THE DIFFERENCE BETWEEN THE LOWEST VALUE AND THE HIGHEST VALUE MUST BE LESS THAN OR EQUAL TO ONE HALF THE TOTAL RANGE INDICATED IN THE PARTICULAR PARAMETER TABULATION.

NOTE 3: CORE IS PAPER CAPPED AND SEALED WITH POLYESTER DIP.

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN D. Gillett DATE 29OCT63
CHECKED 25 OCT 63
APPROVAL 5Nov63
APPROVAL
NASA APPROVAL
MIT APPROVAL WKaffer 5Nov63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CORE, TOROIDAL
TAPE WOUND

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010688
SCALE NONE
WT
SHEET 1 OF 1

PBK

INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

B 1010688

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04472	5 Nov 63	WK
A	REVISED PER TDRR 04698	19 Nov 63	
B	REVISED PER TDRR 06197	5 Feb 64	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN SPECIFICATION ND 1015404, CLASS 3.
2. INSPECTION AND ACCEPTANCE:
   - A. MARKING: TAG PER ND 1002019 AND MARK PERMANENTLY AND LEGIBLY WITH THE NASA PART NUMBER AND REVISION LETTER, AND THE MANUFACTURER'S NAME OR SYMBOL. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE TAG OR PACKAGE. ALSO COLOR CODE, PER TABLE I, EACH CORE WITH TWO DOTS. MINIMUM DOT DIAMETER 1/16" PER MIL-STD-129
   - B. UNIT SHALL MEET REQUIREMENTS OF TABLE I.
3. DESIGN REQUIREMENTS:
   - A. TYPE OF CORE: TAPE WOUND ON STAINLESS STEEL BOBBIN.
   - B. TAPE THICKNESS: 0.001"
   - C. MATERIAL: SQUARE PERMALLOY 80 OR EQUIVALENT (79% NICKEL IRON)
   - D. CORE SIZE (FOR REFERENCE): SEE TABLE I
   - E. MEAN CORE LENGTH (REFERENCE): SEE TABLE I

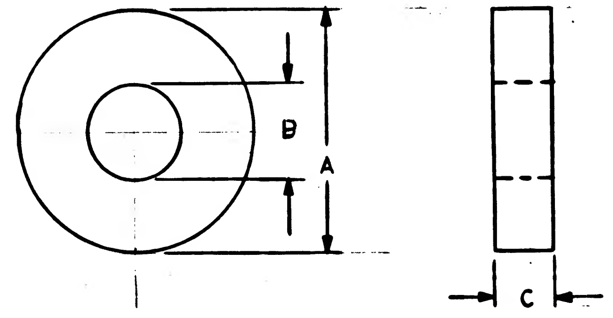


TABLE I PARAMETERS (NOTE: 1 AND 2)

B_M MAXIMUM FLUX DENSITY	B_M-B_R DIFFERENTIAL FLUX DENSITY	A_C EFFECTIVE CORE AREA (FOR REF.)	B_2-B_1 CORE GAIN FLUX DENSITY RANGE	400 CPS TEST FREQUENCY			DIMENSIONS			COLOR CD.	DASH NO.	MEAN CORE LENGTH (FOR REF) CM	CORE SIZE (FOR REF)		
				H_C MAGNETIC INTENSITY FOR $B_M/2$ RESET	H_R MAGNETIC INTENSITY FOR B_2-B_1 RESET	FLUX CAPACITY (FOR REF.)	A MAX	B MIN	C MAX				DIM A	DIM B	DIM C
KILOGAUSSES	KILOGAUSSES	SQ. CM.	KILOGAUSSES	OERSTED	OERSTED	MAXWELLS									
6.9-7.9	0.02-0.20 B_M	0.02	5.0	0.024-0.048	.0035-.0070	300	.379	.218	.175	BR-BR	1010688-1	2.30	.345	.250	.125
6.9-7.9	0.02-0.20 B_M	0.0140	5.0	0.024-0.048	0.004-0.008	210	.410	.220	.100	RED-RED	1010688-2	2.35	.375	.250	.062

NOTE 1: ALL MAGNETIC CORE PARAMETERS SHOULD BE TESTED IN ACCORDANCE WITH AIEE NO. 432, TEST PROCEDURE FOR TOROIDAL MAGNETIC AMPLIFIER CORES.

NOTE 2: IN ANY PARTICULAR SHIPMENT OF CORES THE VALUE OF EACH PARAMETER TESTED SHALL BE SUCH THAT THE DIFFERENCE BETWEEN THE LOWEST VALUE AND THE HIGHEST VALUE MUST BE LESS THAN OR EQUAL TO ONE HALF THE TOTAL RANGE INDICATED IN THE PARTICULAR PARAMETER TABULATION.

NOTE 3: CORE IS PAPER CAPPED AND SEALED WITH POLYESTER DIP.

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN D. A. Hunt DATE 29 OCT 63
CHECKED P. Kenney 25 OCT 63
APPROVAL Buthet 5 Nov 63
APPROVAL
NASA APPROVAL
MIT APPROVAL WKuffer 5 Nov 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CORE, TOROIDAL
TAPE WOUND

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010688
SCALE NONE
WT
SHEET 1 OF 1

PBR

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

C | 1010688

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04472	5Nov63	WK
A	REVISED PER TDRR 04698	19 Nov 63	
B	REVISED PER TDRR 06197	5 Feb 64	WK
C	REVISED PER TDRR 06416	18 FEB 64	LK WK

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN SPECIFICATION ND 1015404, CLASS 3.
2. INSPECTION AND ACCEPTANCE:
   - A. MARKING: TAG PER ND 1002019 AND MARK PERMANENTLY AND LEGIBLY WITH THE NASA PART NUMBER AND REVISION LETTER, AND THE MANUFACTURER'S NAME OR SYMBOL. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE TAG OR PACKAGE. ALSO COLOR CODE, PER TABLE I, EACH CORE WITH TWO DOTS. MINIMUM DOT DIAMETER 1/16" PER MIL-STD-129
   - B. UNIT SHALL MEET REQUIREMENTS OF TABLE I.
3. DESIGN REQUIREMENTS:
   - A. TYPE OF CORE: TAPE WOUND ON STAINLESS STEEL BOBBIN.
   - B. TAPE THICKNESS: 0.001"
   - C. MATERIAL: SQUARE PERMALLOY 80 OR EQUIVALENT (79% NICKEL IRON)
   - D. CORE SIZE (FOR REFERENCE): SEE TABLE I
   - E. MEAN CORE LENGTH (REFERENCE): SEE TABLE I

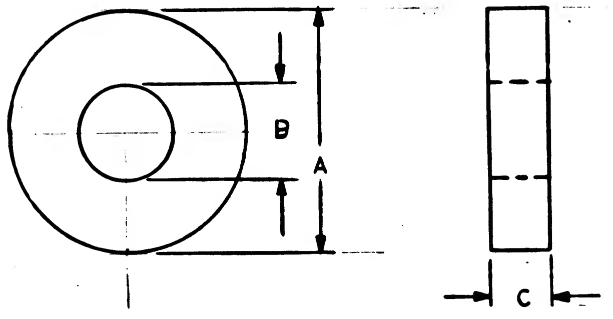


TABLE I PARAMETERS (NOTE: 1 AND 2)

B_M MAXIMUM FLUX DENSITY KILOGAUSSES	B_M-B_R DIFFERENTIAL FLUX DENSITY KILOGAUSSES	A_C EFFECTIVE CORE AREA (FOR REF.) SQ. CM.	B_2-B_1 CORE GAIN FLUX DENSITY RANGE KILOGAUSSES	400 CPS TEST FREQUENCY			DIMENSIONS			COLOR CD.	DASH NO.	MEAN CORE LENGTH (FOR REF) CM	CORE SIZE (FOR REF)		
				H_C MAGNETIC INTENSITY FOR $B_M/2$ RESET OERSTED	H_R MAGNETIC INTENSITY FOR B_2-B_1 RESET OERSTED	FLUX CAPACITY (FOR REF.) MAXWELLS	A MAX	B MIN	C MAX				OD	ID	TAPE WIDTH
6.9-7.9	0.02-0.20 B_M	0.02	5.0	0.024-0.048	.0035-.0070	300	.379	.218	.175	BR-BR	1010688-1	2.30	.345	.250	.125
6.9-7.9	0.02-0.20 B_M	0.0140	5.0	0.024-0.048	0.004-0.008	210	.410	.220	.100	RED-RED	1010688-2	2.35	.375	.250	.062

NOTE 1: ALL MAGNETIC CORE PARAMETERS SHOULD BE TESTED IN ACCORDANCE WITH AIEE NO. 432, TEST PROCEDURE FOR TOROIDAL MAGNETIC AMPLIFIER CORES.

NOTE 2: IN ANY PARTICULAR SHIPMENT OF CORES THE VALUE OF EACH PARAMETER TESTED SHALL BE SUCH THAT THE DIFFERENCE BETWEEN THE LOWEST VALUE AND THE HIGHEST VALUE MUST BE LESS THAN OR EQUAL TO ONE HALF THE TOTAL RANGE INDICATED IN THE PARTICULAR PARAMETER TABULATION.

NOTE 3: CORE IS PAPER CAPPED AND SEALED WITH POLYESTER DIP.

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN D. Gobbet DATE 24OCT63
CHECKED P. Remde 25 OCT 63
APPROVAL Burtheet 5Nov63
APPROVAL
NASA APPROVAL
MIT APPROVAL WKupfer 5Nov63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CORE, TOROIDAL
TAPE WOUND

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010688
SCALE NONE
WT
SHEET 1 OF 1

PBR

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

—	8890101

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04472	5Nov63	WK

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN SPECIFICATION ND 1015404, CLASS 3.
2. INSPECTION AND ACCEPTANCE:
   - A. MARKING: MARK PERMANENTLY AND LEGIBLY WITH THE NASA PART NUMBER AND REVISION LETTER, AND THE MANUFACTURER'S NAME OR SYMBOL. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. ALSO MARK EACH CORE WITH TWO BROWN DOTS. MINIMUM DOT DIAMETER 1/8".
   - B. UNIT SHALL MEET REQUIREMENTS OF TABLE I.
3. DESIGN REQUIREMENTS:
   - A. TYPE OF CORE: TAPE WOUND ON STAINLESS STEEL BOBBIN.
   - B. TAPE THICKNESS: 0.001"
   - C. MATERIAL: SQUARE PERMALLOY 80 OR EQUIVALENT (79% NICKEL IRON)
   - D. CORE SIZE (FOR REFERENCE): O.D. = 0.345, I.D. 0.250, TAPE WIDTH = 0.125
   - E. MEAN CORE LENGTH (REFERENCE): 2.30 CENTIMETERS

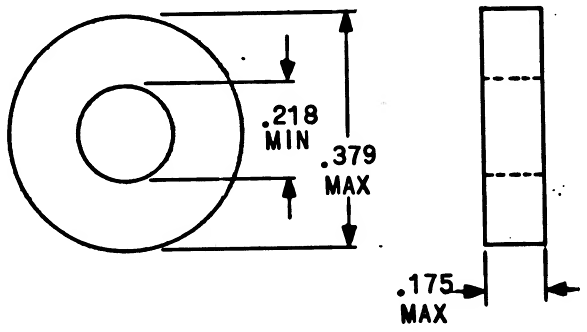
TABLE I PARAMETERS (NOTE: 1 AND 2)

				400 CPS TEST FREQUENCY		
B_M MAXIMUM FLUX DENSITY KILOGAUSSES	B_M-B_R DIFFERENTIAL FLUX DENSITY KILOGAUSSES	A_C EFFECTIVE CORE AREA (FOR REF.) SQ. CM.	B_2-B_1 CORE GAIN FLUX DENSITY RANGE KILOGAUSSES	H_C MAGNETIC INTENSITY FOR $B_M/2$ RESET OERSTED	H_R MAGNETIC INTENSITY FOR B_2-B_1 RESET OERSTED	FLUX CAPACITY (FOR REF.) MAXWELLS
6.9-7.9	0.02-20 B_M	0.02	5.0	0.024-0.048	.0035-.0070	300

NOTE 1: ALL MAGNETIC CORE PARAMETERS DESIGNATED ARE FOR SINUSOIDAL CURRENT EXCITATION AND CONSTANT RESET TESTING PER AIEE PROPOSED STANDARD CORE TEST METHODS TRANSACTIONS PAPER NO. 58-71, FEB. 19, 1958.

NOTE 2: IN ANY PARTICULAR SHIPMENT OF CORES THE VALUE OF EACH PARAMETER TESTED SHALL BE SUCH THAT THE DIFFERENCE BETWEEN THE LOWEST VALUE AND THE HIGHEST VALUE MUST BE LESS THAN OR EQUAL TO ONE HALF THE TOTAL RANGE INDICATED IN THE PARTICULAR PARAMETER TABULATION.

NOTE 3: CORE IS PAPER CAPPED AND SEALED WITH POLYESTER DIP.



MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN D. Dollert DATE 24OCT63
CHECKED 25 OCT 63
APPROVAL 5Nov63
APPROVAL
NASA APPROVAL
MIT APPROVAL WKoppen 5Nov63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CORE, TOROIDAL
TAPE WOUND

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010688
SCALE NONE
WT
SHEET 1 OF 1

PBK

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE -- WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

A 1010689

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 04472	5 Nov 63	WK
A	REVISED PER TDRR 04697	19 Nov 63	

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
2. INSPECTION AND ACCEPTANCE:
   - A. MARKING: TAG PER ND 1002019 AND MARK PERMANENTLY AND LEGIBLY WITH THE NASA DRAWING NUMBER, REVISION LETTER AND THE MANUFACTURER'S NAME OR SYMBOL. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE TAG OR PACKAGE. ALSO COLOR CODE EACH CORE WITH TWO DOTS PER TABLE I MINIMUM DOT DIAMETER 1/8".
   - B. UNIT SHALL MEET REQUIREMENTS OF TABLE I.
3. DESIGN REQUIREMENTS:
   - A. TYPE OF CORE: TAPE WOUND ON STAINLESS STEEL BOBBIN.
   - B. TAPE THICKNESS: 0.001"
   - C. MATERIAL: SQUARE ORTHONOL OR EQUIVALENT (50% NICKEL IRON)
   - D. CORE SIZE (FOR REFERENCE): O.D.=0.345, I.D.=0.250, TAPE WIDTH = 0.125
   - E. MEAN CORE LENGTH = 2.30 CENTIMETERS (REF)

TABLE I PARAMETERS (NOTES: 1 AND 2)

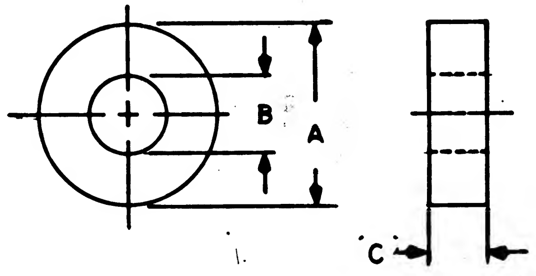
B_M MAXIMUM FLUX DENSITY KILOGAUSSES	B_M-B_R DIFFERENTIAL FLUX DENSITY KILOGAUSSES	A_C EFFECTIVE CORE AREA (FOR REF.) SQ. CM.	B_2-B_1 CORE GAIN FLUX DENSITY RANGE KILOGAUSSES	400 CPS TEST FREQUENCY			DIMENSIONS			COLOR CODE	DASH NO.
				H_C MAGNETIC INTENSITY FOR $B_M/2$ RESET OERSTED	H_R MAGNETIC INTENSITY FOR B_2-B_1 RESET OERSTED	FLUX CAPACITY (FOR REF.) MAXWELLS	A	B	C		
14.0-16.0	0-0.05 B_M	0.02	10.0	0.13-0.26	0.014-0.028	600	.379 MAX	.218 MIN	.175 MAX	BROWN-RED	1010689-1
14.0-16.0	0-0.05 B_M	0.0140	10.0	0.130-0.260	0.017-0.034	420	.410 MAX	.220 MIN	.100 MAX	RED-ORANGE	1010689-2

NOTES:

1: ALL MAGNETIC CORE PARAMETERS DESIGNATED ARE FOR SINUSOIDAL CURRENT EXCITATION AND CONSTANT RESET TEST PER AIEE STANDARD CORE TEST METHOD PAPER NO. 432

2: IN ANY PARTICULAR SHIPMENT OF CORES THE VALUE OF EACH PARAMETER TESTED SHALL BE SUCH THAT THE DIFFERENCE BETWEEN THE LOWEST VALUE AND THE HIGHEST VALUE MUST BE LESS THAN OR EQUAL TO ONE HALF THE TOTAL RANGE INDICATED IN THE PARTICULAR PARAMETER TABULATION.

3: CORE IS PAPER CAPPED AND SEALED WITH POLYESTER DIP.



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT NAS 9-497
DRAWN DATE
CHECKED Zuler 25OCT63
APPROVAL 5 Nov 63
APPROVAL
NASA APPROVAL
MIT APPROVAL 5 Nov 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CORE, TOROIDAL
TAPE WOUND

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010689
SCALE NONE
WT
SHEET 1 OF 1

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

B 6890101

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 04472	5 Nov 63	WK
A	REVISED PER TDRR 04697	19 Nov 63	
B	REVISED PER TDRR 06196	5 Feb 64	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
2. INSPECTION AND ACCEPTANCE:
   - A. MARKING: TAG PER ND 1002019 AND MARK PERMANENTLY AND LEGIBLY WITH THE NASA DRAWING NUMBER, REVISION LETTER AND THE MANUFACTURER'S NAME OR SYMBOL. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE TAG OR PACKAGE. ALSO COLOR CODE EACH CORE WITH TWO DOTS PER TABLE I MINIMUM DOT DIAMETER 1/16"
   - B. UNIT SHALL MEET REQUIREMENTS OF TABLE I.
3. DESIGN REQUIREMENTS:
   - A. TYPE OF CORE: TAPE WOUND ON STAINLESS STEEL BOBBIN.
   - B. TAPE THICKNESS: 0.001"
   - C. MATERIAL: SQUARE ORTHONOL OR EQUIVALENT (50% NICKEL IRON)
   - D. CORE SIZE (FOR REFERENCE): SEE TABLE I
   - E. MEAN CORE LENGTH = SEE TABLE I

TABLE I PARAMETERS (NOTES: 1 AND 2)

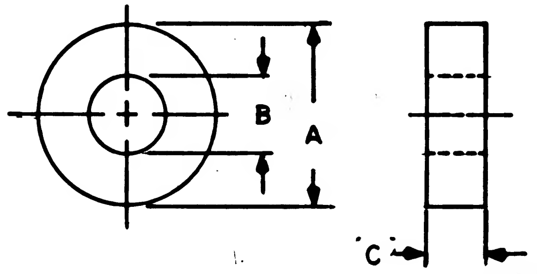
B_M MAXIMUM FLUX DENSITY	B_M-B_R DIFFERENTIAL FLUX DENSITY	A_C EFFECTIVE CORE AREA (FOR REF.)	B_2-B_1 CORE GAIN FLUX DENSITY RANGE	400 CPS TEST FREQUENCY: H_C MAGNETIC INTENSITY FOR $B_M/2$ RESET	400 CPS TEST FREQUENCY: H_R MAGNETIC INTENSITY FOR B_2-B_1 RESET	400 CPS TEST FREQUENCY: FLUX CAPACITY (FOR REF.)	DIMENSIONS A	DIMENSIONS B	DIMENSIONS C	COLOR CODE	DASH NO.	MAXIMUM CORE LENGTH (FOR REF)	CORE SIZE (FOR REF) DIM A	CORE SIZE (FOR REF) DIM B	CORE SIZE (FOR REF) DIM C
KILOGAUSSES	KILOGAUSSES	SQ. CM.	KILOGAUSSES	OERSTED	OERSTED	MAXWELLS						CM			
14.0-16.0	0-0.05 B_M	0.02	10.0	0.13-0.26	0.014-0.028	600	.379 MAX	.218 MIN	.175 MAX	BROWN-RED	1010689-1	2.30	.345	.250	.125
14.0-16.0	0-0.05 B_M	0.0140	10.0	0.130-0.260	0.017-0.034	420	.410 MAX	.220 MIN	.100 MAX	RED-ORANGE	1010689-2	2.35	.375	.250	.062

NOTES:

1: ALL MAGNETIC CORE PARAMETERS SHOULD BE TESTED IN ACCORDANCE WITH AIEE NO. 432 TEST PROCEDURE FOR TOROIDAL MAGNETIC AMPLIFIER CORES.

2: IN ANY PARTICULAR SHIPMENT OF CORES THE VALUE OF EACH PARAMETER TESTED SHALL BE SUCH THAT THE DIFFERENCE BETWEEN THE LOWEST VALUE AND THE HIGHEST VALUE MUST BE LESS THAN OR EQUAL TO ONE HALF THE TOTAL RANGE INDICATED IN THE PARTICULAR PARAMETER TABULATION.

3: CORE IS PAPER CAPPED AND SEALED WITH POLYESTER DIP.



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN [illegible] DATE 24OCT63
CHECKED [illegible] 25OCT63
APPROVAL [illegible] 5 Nov 63
APPROVAL
NASA APPROVAL
MIT APPROVAL [illegible] 5 Nov 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CORE, TOROIDAL
TAPE WOUND

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010689
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

6890101

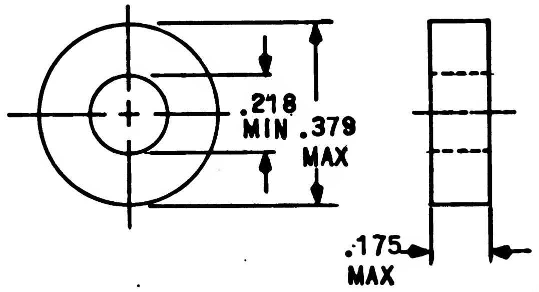
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR D4472	5 NOV 63	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
2. INSPECTION AND ACCEPTANCE:
   - A. MARKING: MARK PERMANENTLY AND LEGIBLY WITH THE NASA DRAWING NUMBER, REVISION LETTER AND THE MANUFACTURER'S NAME OR SYMBOL. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. ALSO MARK EACH CORE WITH A BROWN DOT AND RED DOT. MINIMUM DOT DIAMETER 1/8".
   - B. UNIT SHALL MEET REQUIREMENTS OF TABLE I.
3. DESIGN REQUIREMENTS:
   - A. TYPE OF CORE: TAPE WOUND ON STAINLESS STEEL BOBBIN.
   - B. TAPE THICKNESS: 0.001"
   - C. MATERIAL: SQUARE ORTHONOL OR EQUIVALENT (50% NICKEL IRON)
   - D. CORE SIZE (FOR REFERENCE): O.D.=0.345, I.D.=0.250, TAPE WIDTH = 0.125
   - E. MEAN CORE LENGTH = 2.30 CENTIMETERS (REF)

TABLE I PARAMETERS (NOTES: 1 AND 2)

B_M MAXIMUM FLUX DENSITY	B_M-B_R DIFFERENTIAL FLUX DENSITY	A_C EFFECTIVE CORE AREA (FOR REF.)	B_2-B_1 CORE GAIN FLUX DENSITY RANGE	400 CPS TEST FREQUENCY		
				H_C MAGNETIC INTENSITY FOR $B_M/2$ RESET	H_R MAGNETIC INTENSITY FOR B_2-B_1 RESET	FLUX CAPACITY (FOR REF.)
KILOGAUSSES	KILOGAUSSES	SQ. CM.	KILOGAUSSES	OERSTED	OERSTED	MAXWELLS
14.0-16.0	0-0.05 B_M	0.02	10.0	0.13-0.26	0.014-0.028	600



NOTES:

1: ALL MAGNETIC CORE PARAMETERS DESIGNATED ARE FOR SINUSOIDAL CURRENT EXCITATION AND CONSTANT RESET TEST PER AIEE PROPOSED STANDARD CORE TEST METHODS TRANSACTIONS PAPER NO. 58-71, FEB. 19, 1958.

2: IN ANY PARTICULAR SHIPMENT OF CORES THE VALUE OF EACH PARAMETER TESTED SHALL BE SUCH THAT THE DIFFERENCE BETWEEN THE LOWEST VALUE AND THE HIGHEST VALUE MUST BE LESS THAN OR EQUAL TO ONE HALF THE TOTAL RANGE INDICATED IN THE PARTICULAR PARAMETER TABULATION.

3: CORE IS PAPER CAPPED AND SEALED WITH POLYESTER DIP.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN D. Abbott DATE 24OCT63
CHECKED 25OCT63
APPROVAL 5 NOV 63
APPROVAL
NASA APPROVAL
MIT APPROVAL 5 Nov 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CORE, TOROIDAL
TAPE WOUND

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010689
SCALE NONE
WT
SHEET 1 OF 1

1010689

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

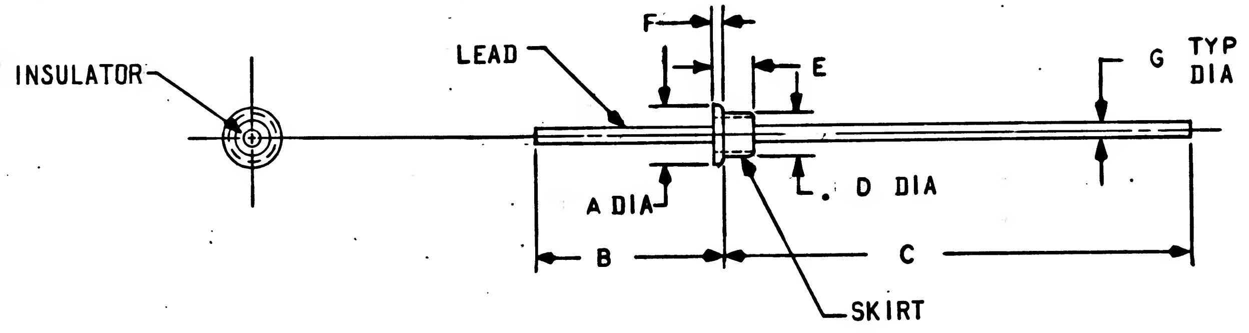
A	0690101

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 04528	11/6/63	WK
A	REVISED PER TDRR 17929	4/27/65	WK

(M)

REQUIREMENTS:

1. GENERAL:
   A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISION SPECIFIED IN ND 1015404, CLASS 3.
2. INSPECTION AND ACCEPTANCE:
   A. VISUAL INSPECTION: WORKMANSHIP.
   B. MECHANICAL REQUIREMENTS:
      (1) MATERIAL:
         a. LEAD: IRON-NICKEL-COBALT ALLOY, PER ND 1015402.
         b. SKIRT: SAME AS LEAD.
         c. INSULATOR: CORNING 7052 OR EQUIVALENT.
      (2) FINISH:
         a. LEAD: GOLD PLATED PER MIL-G-45204 (ELECTRO DEPOSITED .000050 MIN., .000150 MAX. OVER .000010 MAX. NICKEL STRIKE.
         b. SKIRT: SAME AS LEAD.
         c. INSULATOR: DOW CORNING NO. 1107 SILICONE COATING OR EQUIVALENT.
      (3) DIMENSIONS: PER FIGURE.
      (4) MARKING:
         a. PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED PER MIL-STD-129, WITH THE FOLLOWING INFORMATION.
            SUPPLIER'S NAME.
            NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER.
            SUPPLIER'S LOT OR SERIAL NUMBER.
            DATE CODE, OR DATE OF MANUFACTURE.
         b. MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.
3. DESIGN REQUIREMENTS:
   A. LEAK RATE: MAX. OF 1×10^{-8} CC OF HELIUM/SEC. AT ONE ATMOSPHERE OF PRESSURE.
   B. CURRENT CAPACITY: 3.0 AMPS CONTINUOUS DUTY FOR 40°C RISE.
   C. RMS TEST VOLTS: 1000 VOLTS AT 90% HUMIDITY AT SEA LEVEL.



PART NUMBER	A	B	C	D	E	F	G
1010690-1	.155 .145	.42 .36	1.03 .97	.130 .120	.065 .055	.015 .005	.032 .028
1010690-2	.139 .129	.202 .172	.315 .285	.117 .107	.080 .070	.022 .012	.042 .038

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN D. Dobbert DATE 22 OCT 63
CHECKED C. Wilson 23 OCT 63
APPROVAL 6 NOV 63
APPROVAL
NASA APPROVAL W. J. Rhine 11-6-63
MIT APPROVAL E. J. Wilson 11/6/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL, GLASS, FEED THRU

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010690
SCALE NONE
WT
SHEET 1 OF 1

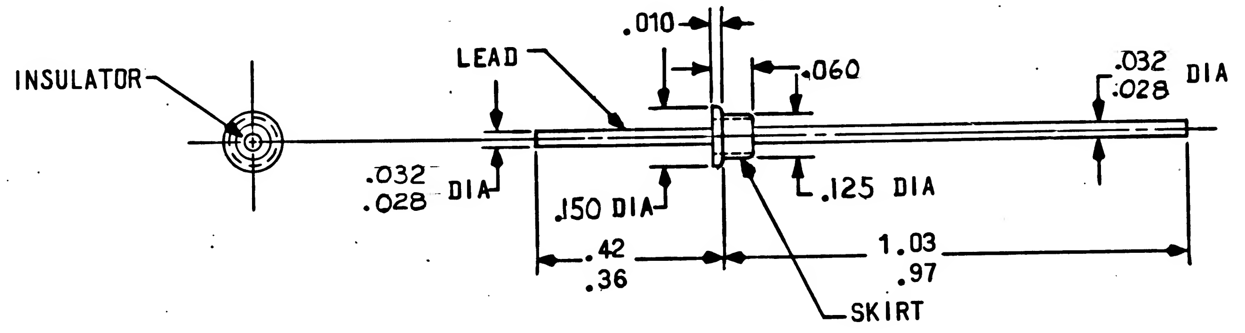
	0690101

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 04528	11/6/63	

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISION SPECIFIED IN ND 1015404, CLASS 3.
2. INSPECTION AND ACCEPTANCE:
   - A. VISUAL INSPECTION: WORKMANSHIP.
   - B. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL:
       - a. LEAD: IRON-NICKEL-COBALT ALLOY, PER ND 1015402.
       - b. SKIRT: SAME AS LEAD.
       - c. INSULATOR-CORNING 7052 OR EQUIVALENT.
     - (2) FINISH:
       - a. LEAD: GOLD PLATED PER MIL-G-45204 (ELECTRO DEPOSITED .000050 MIN., .000150 MAX. OVER .000010 MAX. NICKEL STRIKE.
       - b. SKIRT: SAME AS LEAD.
       - c. INSULATOR: DOW CORNING NO. 1107 SILICONE COATING OR EQUIVALENT.
     - (3) DIMENSIONS: PER FIGURE.
     - (4) MARKING:
       - a. PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION.
         - SUPPLIER'S NAME.
         - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER.
         - SUPPLIER'S LOT OR SERIAL NUMBER.
         - DATE CODE, OR DATE OF MANUFACTURE.
       - b. MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.
3. DESIGN REQUIREMENTS:
   - A. LEAK RATE: MAX. OF 1×10^{-8} CC OF HELIUM/SEC. AT ONE ATMOSPHERE OF PRESSURE.
   - B. CURRENT CAPACITY: 3.0 AMPS CONTINUOUS DUTY FOR 40°C RISE.
   - C. RMS TEST VOLTS: 1000 VOLTS AT 90% HUMIDITY AT SEA LEVEL.



NASA PART NUMBER
1010690-1

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG NO
CONTRACT NAS 9-497
DRAWN D. Doffert DATE 22 OCT 63
CHECKED C. Wilson 23 OCT 63
APPROVAL 6 NOV 63
APPROVAL
NASA APPROVAL W. J. Rhine 11-6-63
MIT APPROVAL G. J. Wilson 11/6/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL, GLASS,
FEED THRU

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010690

SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

∀ 1690101

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04472	5Nov63	WK
A	REVISED PER TDRR 13957	11-12-64	WK

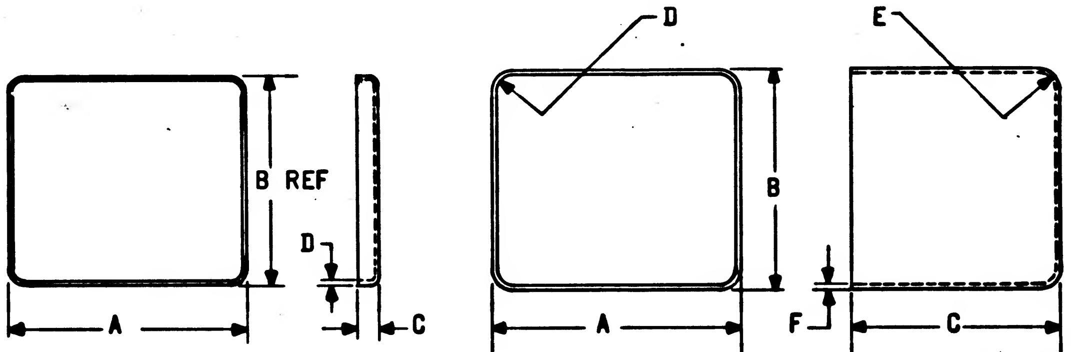
REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL:
       - (a) CRS STEEL PER QQ-S-636 CONDITION 5
       - (b) ALUMINUM TYPE 1100 PER QQ-A-561C
       - (c) MU-METAL: PER SCD 2021562-1
     - (2) MARKING:
       - (a) PIECEMARKING: PART SHALL BE PERMANENTLY AND LEGIBLY MARKED PER ND 1002019 WITH THE NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.
       - (b) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME.
         - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER.
         - DATE CODE, OR DATE OF MANUFACTURE.
       - (c) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

NASA PART NUMBER	A	B	C	D	E	F	MANUFACTURER'S PART NUMBER	MATERIAL (SEE REQUIREMENTS)
	CASE							
1010691-1	1.196 1.180	1.604 1.584	.985 .953	.244 .224	.110 .078	.033 .027		COLD ROLLED STEEL
1010691-2	.883 .867	1.071 1.055	.985 .953	.104 .084	.110 .078	.021 .016		COLD ROLLED STEEL
1010691-3	.883 .867	1.071 1.055	.735 .703	.104 .084	.110 .078	.021 .016		COLD ROLLED STEEL
1010691-6	1.196 1.180	1.196 1.180	.985 .953	.151 .131	.110 .078	.021 .016		COLD ROLLED STEEL
1010691-7	1.071 1.055	1.398 1.382	1.766 1.734	.073 .053	.079 .047	.021 .016		ALUMINUM
1010691 - 8	.992 1.008	1.584 1.604	1 1/2 ± 1/64	.135 .105	.078 .048	.021 .016		MU-METAL

NASA PART NUMBER	COVER	A (REF)	B (REF)	C	D	MATERIAL (SEE REQUIREMENTS)
1010691-4	INSIDE	.830	1.020	.166 .146	.021 .016	COLD ROLLED STEEL
1010691-5	INSIDE	1.144	1.144	.104 .084	.021 .016	COLD ROLLED STEEL
1010691 - 9	OUTSIDE	1.012	1.609	.198 .178	.021 .016	MU-METAL



COVER (INSIDE)

CASE

1010691

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

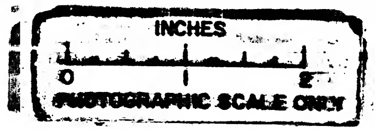
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS9-497
DRAWN R.W. Turner DATE 17 OCT 63
CHECKED Ed Foster 21 OCT 63
APPROVAL J. L. Wagner 21 OCT 63
APPROVAL B. Katz 5 Nov 63
NASA APPROVAL
MIT APPROVAL W Kupfer 5 Nov 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CASE AND COVER - RECTANGULAR

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010691
SCALE
WT
SHEET 1 OF 1



4 3 2 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

B	1690101

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04472	5Nov63	WK
A	REVISED PER TDRR 13957	1-12-64	WK
B	REVISED PER TDRR 14728	12/15/64	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL:
       - (a) CRS STEEL PER QQ-S-636 CONDITION 5
       - (b) ALUMINUM TYPE 1100 PER QQ-A-561C
       - (c) MU-METAL: PER SCD 2021562-1
     - (2) MARKING:
       - (a) PIECEMARKING: PART SHALL BE PERMANENTLY AND LEGIBLY MARKED PER ND 1002019 WITH THE NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.
       - (b) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME.
         - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER.
         - DATE CODE, OR DATE OF MANUFACTURE.
       - (c) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

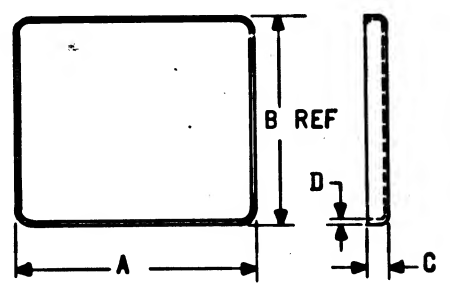
CASE

NASA PART NUMBER	A	B	C	D	E	F	MANUFACTURER'S PART NUMBER	MATERIAL (SEE REQUIREMENTS)
1010691-1	1.196 1.180	1.604 1.584	.985 .953	.244 .224	.110 .078	.033 .027		COLD ROLLED STEEL
1010691-2	.883 .867	1.071 1.055	.985 .953	.104 .084	.110 .078	.021 .016		COLD ROLLED STEEL
1010691-3	.883 .867	1.071 1.055	.735 .703	.104 .084	.110 .078	.021 .016		COLD ROLLED STEEL
1010691-6	1.196 1.180	1.196 1.180	.985 .953	.151 .131	.110 .078	.021 .016		COLD ROLLED STEEL
1010691-7	1.071 1.055	1.398 1.382	1.766 1.734	.073 .053	.079 .047	.021 .016		ALUMINUM
1010691 - 8	.992 1.008	1.584 1.604	1 1/2 ± 1/64	.135 .105	.078 .048	.021 .016		MU-METAL

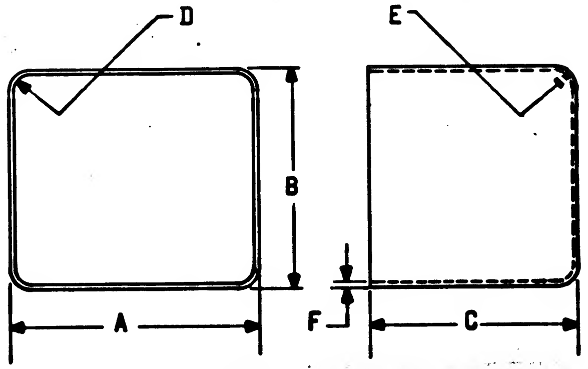
CASE (CON'D)

NASA PART NO.	A	B	C	D	E	F	MATERIAL SEE REQUIREMENTS
1010691-10	1.071 1.055	1.398 1.382	2.016 1.984	.073 .053	.079 .047	.021 .016	ALUMINUM

NASA PART NUMBER	COVER	A (REF)	B (REF)	C	D	MATERIAL (SEE REQUIREMENTS)
1010691-4	INSIDE	.830	1.020	.166 .146	.021 .016	COLD ROLLED STEEL
1010691-5	INSIDE	1.144	1.144	.104 .084	.021 .016	COLD ROLLED STEEL
1010691 - 9	OUTSIDE	1.012	1.609	.198 .178	.021 .016	MU-METAL



COVER (INSIDE)



CASE

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

NEXT ASSY	USED ON
APPLICATION	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT NAS9-697
DRAWN R.W. Thomas DATE 17 OCT 63
CHECKED Ed Foster 21 OCT 63
APPROVAL J. L. Way 21 OCT 63
APPROVAL B Katz 5 Nov 63
NASA APPROVAL
MIT APPROVAL WKupfer 5Nov63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CASE AND COVER - RECTANGULAR

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010691
SCALE WT SHEET 1 OF 1

4 3 2 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER: AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04472	5Nov63	WK
A	REVISED PER TDRR 13957	1-2-64	WK
B	REVISED PER TDRR 14728	12/15/64	WK
C	REVISED PER TDRR 17437	23Mar65	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL:
       - (a) CRS STEEL PER QQ-S-636 CONDITION 5
       - (b) ALUMINUM TYPE 1100 PER QQ-A-561C
       - (c) MU-METAL: PER SCD 2021562-1
     - (2) MARKING:
       - (a) PIECEMARKING: PART SHALL BE PERMANENTLY AND LEGIBLY MARKED PER ND 1002019 WITH THE NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.
       - (b) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME.
         - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER.
         - DATE CODE, OR DATE OF MANUFACTURE.
       - (c) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

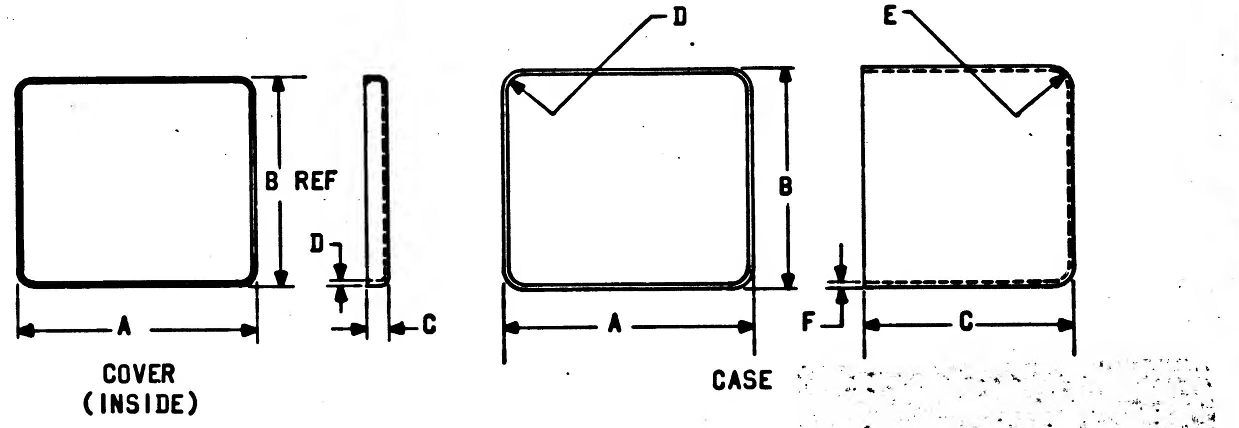
CASE (CON'D)

NASA PART NO.	A	B	C	D	E	F	MATERIAL SEE REQUIREMENTS
1010691-10	1.071 1.055	1.398 1.382	2.016 1.984	.073 .053	.079 .047	.021 .016	ALUMINUM
1010691-11	2.578 2.547	2.953 2.922	3.188 3.156	.167 .146	.141 .104	.027 .022	COLD ROLLED STEEL

CASE

NASA PART NUMBER	A	B	C	D	E	F	MANUFACTURER'S PART NUMBER	MATERIAL (SEE REQUIREMENTS)
1010691-1	1.196 1.180	1.604 1.584	.985 .953	.244 .224	.110 .078	.033 .027		COLD ROLLED STEEL
1010691-2	.883 .867	1.071 1.055	.985 .953	.104 .084	.110 .078	.021 .016		COLD ROLLED STEEL
1010691-3	.883 .867	1.071 1.055	.735 .703	.104 .084	.110 .078	.021 .016		COLD ROLLED STEEL
1010691-6	1.196 1.180	1.196 1.180	.985 .953	.151 .131	.110 .078	.021 .016		COLD ROLLED STEEL
1010691-7	1.071 1.055	1.398 1.382	1.766 1.734	.073 .053	.079 .047	.021 .016		ALUMINUM
1010691 - 8	.992 1.008	1.584 1.604	1 1/2 ± 1/64	.135 .105	.078 .048	.021 .016		MU-METAL

NASA PART NUMBER	COVER	A (REF)	B (REF)	C	D	MATERIAL (SEE REQUIREMENTS)
1010691-4	INSIDE	.830	1.020	.166 .146	.021 .016	COLD ROLLED STEEL
1010691-5	INSIDE	1.144	1.144	.104 .084	.021 .016	COLD ROLLED STEEL
1010691 - 9	OUTSIDE	1.012	1.609	.198 .178	.021 .016	MU-METAL



MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

NEXT ASSY	USED ON
APPLICATION	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS. NAS9-497
DWG. NO. CONTRACT

DRAWN DATE 17OCT63
CHECKED Ed Foster 21 OCT 63
APPROVAL 21 OCT 63
APPROVAL 5 NOV 63
NASA APPROVAL
MIT APPROVAL 5Nov63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CASE AND COVER - RECTANGULAR

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010691
SCALE	WT	SHEET 1 OF 1

—	1690101

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04472	5Nov63	WK

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

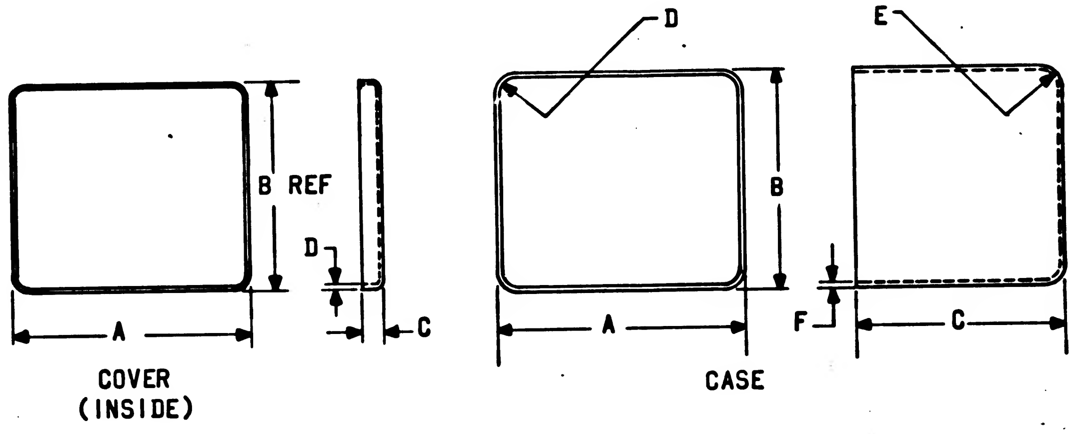
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL:
       - (a) CRS STEEL PER QQ-S-636 CONDITION 5
       - (b) ALUMINUM TYPE 1100 PER QQ-A-561C
     - (2) MARKING:
       - (a) PIECEMARKING: PART SHALL BE PERMANENTLY AND LEGIBLY MARKED PER MIL-STD-130 WITH THE NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.
       - (b) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME.
         - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER.
         - DATE CODE, OR DATE OF MANUFACTURE.
       - (c) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

CASE

NASA PART NUMBER	A	B	C	D	E	F	MANUFACTURER'S PART NUMBER	MATERIAL (SEE REQUIREMENTS)
1010691-1	1.196 1.180	1.604 1.584	.985 .953	.244 .224	.110 .078	.033 .027		COLD ROLLED STEEL
1010691-2	.833 .867	1.071 1.055	.985 .953	.104 .084	.110 .078	.021 .016		COLD ROLLED STEEL
1010691-3	.883 .867	1.071 1.055	.735 .703	.104 .084	.110 .078	.021 .016		COLD ROLLED STEEL
1010691-6	1.196 1.180	1.196 1.180	.985 .953	.151 .131	.110 .078	.021 .016		COLD ROLLED STEEL
1010691-7	1.071 1.055	1.398 1.382	1.766 1.734	.073 .053	.079 .047	.021 .016		ALUMINUM

COVER (INSIDE)

NASA PART NUMBER		A (REF)	B (REF)	C	D	MATERIAL (SEE REQUIREMENTS)
1010691-4		.830	1.020	.166 .146	.021 .016	COLD ROLLED STEEL
1010691-5		1.144	1.144	.104 .084	.021 .016	COLD ROLLED STEEL



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS. NAS9-497
DWG. NO. CONTRACT

DRAWN R.W. Turner DATE 17 OCT 63
CHECKED Ed Foster 21 OCT 63
APPROVAL J. L. Wayne 21 OCT 63
APPROVAL B Katz 5 Nov 63

NASA APPROVAL
MIT APPROVAL W Kupfer 5 Nov 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CASE AND COVER - RECTANGULAR

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010691
SCALE
WT
SHEET 1 OF 1

1010691

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010692 A

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04694	11/19/63	
A	REVISED PER TDRR 13242	10/19/64	ETS.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 2.
   - C. EACH SHIPPING CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS AND DATE OF MANUFACTURE PER MIL-STD-129.
2. ACCEPTANCE AND INSPECTION REQUIREMENTS:
   - A. CLASSIFICATION:
     - (1) GEE - FOR GENERAL PURPOSE APPLICATIONS.
   - B. FORM:
     - (1) RODS (MOLDED) - GLASS EPOXY RODS SHALL CONFORM TO THE REQUIREMENTS OF TABLE I.
     - (2) TUBES - TUBES SHALL CONFORM TO THE PROPERTIES OF TABLE II.
     - (3) TEST METHOD 1:
       - (a) SPECIMENS: THE TEST SPECIMENS, ONE FROM EACH SAMPLE LENGTH OF ROD SHALL BE 1 INCH IN LENGTH FOR RODS 1 INCH OR LESS IN DIAMETER, AND 1/2 INCH IN LENGTH FOR LARGER DIAMETER RODS. THE DIAMETER OF THE SPECIMEN SHALL BE IN THE DIAMETER OF THE FINISHED ROD. THE TEST SPECIMENS, ONE FROM EACH SAMPLE LENGTH OF TUBE, SHALL BE THE FULL SECTION OF THE TUBE AND 1 INCH IN LENGTH FOR TUBES LESS THAN 3 INCHES IN OUTSIDE DIAMETER. FOR TUBES 3 INCHES OR MORE IN OUTSIDE DIAMETER, A RECTANGULAR SPECIMEN SHALL BE CUT 3 INCHES IN LENGTH IN THE CIRCUMFERENTIAL DIRECTION OF THE TUBE AND 1 INCH IN WIDTH LENGTHWISE OF THE TUBE.
       - (b) PROCEDURE: THE SPECIMENS SHALL BE INDIVIDUALLY WEIGHED AND THEN SUBJECTED TO 105° ± 2°C FOR 60 + 6, -0 MINUTES, COOLED IN A DESSICATOR FOR AT LEAST 2 HOURS, AND REWEIGHED (W_1). THE SPECIMENS SHALL THEN BE IMMERSED IN DISTILLED WATER FOR 24 ± 1 HOURS AT 23° ± 2°C. THEY SHALL BE REMOVED INDIVIDUALLY AS NEEDED, ALL SURFACES WIPED OFF WITH A DAMP CLOTH, AND THEN REWEIGHED IMMEDIATELY (W_2). THE TEST SHALL BEGIN WITHIN 1 MINUTE AFTER REMOVAL OF THE SPECIMENS FROM THE WATER AND SHALL BE COMPLETED AS RAPIDLY AS CONSISTENT WITH ACCURACY. SPECIMENS 1/16 INCH OR LESS IN THICKNESS SHALL BE PLACED IN A WEIGHING BOTTLE IMMEDIATELY AFTER WIPING AND SHALL BE WEIGHED IN THE BOTTLE. NO CORRECTION SHALL BE MADE FOR WATER SOLUBLE MATTER. THE PERCENTAGE OF WATER ABSORPTION SHALL BE CALCULATED IN THE FOLLOWING MANNER:

$$\text{PERCENT OF WATER ABSORPTION IN 24 HOURS} = \frac{W_2 - W_1}{W_1} \times 100$$

PROCURE ONLY FROM APPROVED SOURCE LISTED IN ND 1002034 FOR THIS DRAWING.

RODS (GEE MATERIAL)	
DASH NO.	NOMINAL DIA
1010692-1	NOT AVAILABLE
-2	NOT AVAILABLE
-3	NOT AVAILABLE
-4	NOT AVAILABLE
-5	5/32
-6	3/16
-7	7/32
-8	1/4
-9	9/32
-10	5/16
-11	11/32
-12	3/8
-13	13/32
-14	7/16
-15	15/32
-16	1/2
-17	17/32

Ⓐ

RODS (GEE MATERIAL)	
DASH NO.	NOMINAL DIA
1010692-18	9/16
-19	19/32
-20	5/8
-21	21-32
-22	11/16
-23	23/32
-24	3/4
-25	25/32
-26	13/16
-27	27/32
-28	7/8
-29	29/32
-30	15/16
-31	31/32
-32	1"

TABLE I

PHYSICAL PROPERTIES FOR MOLDED RODS

PROPERTY	TEST METHOD	DIAMETER (INCH)	VALUE	
			GEE	
WATER ABSORPTION (%, MAX)	1	1/4 TO 1/2 1/2 TO 2 INCL.	0.75 0.50	
COMPRESSIVE STRENGTH AXIALLY (PSI, MIN)	2	ALL	35,000	
FLEXURAL STRENGTH (PSI, MIN)	ASTM D349	UP TO 1	35,000	
SPECIFIC GRAVITY (MIN)	METHOD 5011 OR 5012 OF FED-STD-406	ALL	1.70	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497

DRAWN J. Parks DATE 1OCT63
CHECKED 3OCT63
APPROVAL 18 NOV 63
APPROVAL

NASA APPROVAL Jack Bresnan

MIT APPROVAL 11/19/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LAMINATED PLASTIC,
THERMOSETTING,
GLASS CLOTH EPOXY RESIN

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010692

SCALE NONE WT SHEET 1 OF 3

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION [illegible] UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR AN[illegible]LIGATION W[illegible]SOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE F[illegible]MULATED, FUR[illegible]HED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010692 A

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04694	11/19/63	
A	REVISED PER TDRR 13242	10/14/64	

(4) TEST METHOD 2:

(a) COMPRESSION (RODS AND TUBES): THE AXIAL COMPRESSION STRENGTH OF THE RODS AND TUBES SHALL BE TESTED IN ACCORDANCE WITH METHOD 1021 OF SPECIFICATION FED-STD-406 EXCEPT THAT THE LENGTH OF THE SPECIMENS SHALL BE AS SPECIFIED IN TABLE III.

(5) TEST METHOD 3:

(a) SPECIMENS: THE TEST SPECIMENS SHALL BE 12 INCHES LONG. THE TEST SPECIMENS SHALL BE EQUIPPED WITH THE ELECTRODES AS SPECIFIED IN TABLE IV.

(b) PROCEDURE: THE DIELECTRIC STRENGTH PERPENDICULAR TO THE LAMINATION SHALL BE DETERMINED BY THE SHORT-TIME TEST AS SPECIFIED IN METHOD 4031 OF SPECIFICATION FED-STD-406 THE TESTS SHALL BE MADE UNDER OIL AT A FREQUENCY NOT EXCEEDING 100 CPS. THE VOLTAGE IN THE SHORT-TIME TEST SHALL BE INCREASED IN INCREMENTS OF 500V/SEC.

3. DESIGN REQUIREMENTS:

A. RODS AND TUBES:

(1) LENGTH: THE SUPPLIER'S STANDARD LENGTH, ± 1 INCH SHALL BE ACCEPTABLE.

(2) DIAMETER AND WALL THICKNESS: THE DIAMETER OF MOLDED RODS AND THE INSIDE DIAMETER OUTSIDE DIAMETER, AND WALL THICKNESS SHALL BE AS SPECIFIED.

(3) TOLERANCES ON ROD DIAMETER: TOLERANCE ON MOLDED RODS SHALL BE AS LISTED IN TABLE V, UNLESS OTHERWISE SPECIFIED.

(4) TOLERANCES ON DIAMETERS OF TUBES: UNLESS OTHERWISE SPECIFIED, TUBE DIAMETERS SHALL HAVE THE TOLERANCE LISTED IN TABLE VI.

(5) FINISH:

(a) RODS AND TUBES: BUFFED, UNLESS OTHERWISE SPECIFIED.

(6) MACHINABILITY: THE MATERIAL SHALL BE SUCH THAT IT CAN BE DRILLED, TAPPED, SAWED, AND MACHINED IN ALL DIRECTIONS IN ACCORDANCE WITH THE SUPPLIER'S RECOMMENDED TECHNIQUE WITHOUT CRACKING, SPLITTING, OR OTHERWISE IMPAIRING THE MATERIAL FOR GENERAL USE.

TABLE II

PROPERTIES FOR ROUND ROLLED TUBES

PROPERTY	TEST METHOD	WALL THICKNESS (INCH)	VALUE	
			GEE	
SPECIFIC GRAVITY (MIN)	METHOD 5011 OR 5012 OF FED-STD-406	1/8 - 1/2 1/2 - 8	1.65 1.70	
WATER ABSORPTION (% MAX)	1	1/32 - 1/16 1/16 - 3/32 3/32 - 1/8 1/8 - 3/16 3/16 - 1/4 1/4 - 1	1.0 0.8 0.7 0.6 0.5 0.4	
COMPRESSIVE STRENGTH (PSI, MIN)	2	1/16 UP	20,000	
DIELECTRIC STRENGTH (V/MIL, MIN)	3	1/32 - 1/16 1/16 - 1/8 1/8 - 1/4 1/4 - 1/2	350 250 200 150	
TENSILE STRENGTH (PSI, MIN)	METHOD 1011 OF FED-STD-406		20,000	

TUBES (GEE MATERIAL)

DASH NO.	NOMINAL	
	ID	OD
1010692-201	1/8	1/4
1010692-202	.640	.680

MASTE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS.
DWG. NO
CONTRACT NAS 9-497
DRAWN J. Parks DATE 1OCT63
CHECKED 30CT63
APPROVAL D. R. Test 18NOV63
APPROVAL
NASA APPROVAL
MIT APPROVAL 11/19/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LAMINATED PLASTIC,
THERMOSETTING,
GLASS CLOTH EPOXY RESIN
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010692
SCALE NONE
WT
SHEET 2 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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A	1010692

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04694	11/19/63	
A	REVISED PER TDRR 13242	10/14/64	

TABLE III

SPECIMEN LENGTH OF RODS AND TUBES

OUTSIDE DIAMETER (INCH)	LENGTH (INCH)
RODS	
1/8 TO 1/4, INCL	1/2
ABOVE 1/4 TO 1/2, INCL	1
ABOVE 1/2 TO 1, INCL	2
ABOVE 1 TO 2, INCL	4
TUBES	
UP TO 2, INCL	1

TABLE IV

ELECTRODES FOR DIELECTRIC TESTS OF TUBES

SPECIMEN ID (INCHES)	INNER ELECTRODE	OTHER ELECTRODE
1.5 OR LESS	MERCURY OR BRASS ROD, 3 INCHES LONG, WITH EDGES ROUNDED TO A 1/4 INCH RADIUS AND OF SUCH DIAMETER THAT IT FITS SNUGLY IN THE TUBE.	METAL FOIL
GREATER THAN 1.5	MERCURY OR METAL FOIL	METAL FOIL

TABLE V

DIAMETER TOLERANCES ON MOLDED RODS

NOMINAL DIAMETER (INCHES)	PERMISSIBLE VARIATION (± INCH)
1/8 TO 1-15/16, INCL.	0.005
2 TO 4, INCL.	0.008

TABLE VI

DIAMETER TOLERANCES ON ROUND ROLLED TUBES

NOMINAL DIAMETER (INCHES)	INSIDE DIAMETER (± INCH)		OUTSIDE DIAMETER (± INCH)
	STEEL MANDREL	BUILT-UP MANDREL	
1/8 TO 23/32, INCL.	0.003	-	0.005
3/4 TO 1-15/16, INCL.	0.004	-	0.005
2 TO 4, INCL.	0.008	-	0.008
4-1/8 TO 12, INCL.	0.010	-	0.025 TURNED
12-1/8 TO 18, INCL.	0.030	0.060	0.030
18-1/8 TO 24, INCL.	0.040	0.075	0.035
24-1/8 TO 48, INCL.	0.060	0.090	0.040

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN J. Parks DATE 1 OCT 63
CHECKED 3 OCT 63
APPROVAL 18 NOV 63
APPROVAL
NASA APPROVAL
MIT APPROVAL 11/19/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LAMINATED PLASTIC,
THERMOSETTING,
GLASS CLOTH EPOXY RESIN

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010692
SCALE
WT
SHEET 3 OF 3

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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—	1010692

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04694	11/19/63	

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 2.
   - C. EACH SHIPPING CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS AND DATE OF MANUFACTURE.
2. ACCEPTANCE AND INSPECTION REQUIREMENTS:
   - A. CLASSIFICATION:
     - (1) GEE - FOR GENERAL PURPOSE APPLICATIONS.
   - B. FORM:
     - (1) RODS (MOLDED) - GLASS EPOXY RODS SHALL CONFORM TO THE REQUIREMENTS OF TABLE I.
     - (2) TUBES - TUBES SHALL CONFORM TO THE PROPERTIES OF TABLE II.
     - (3) TEST METHOD 1:
       - (a) SPECIMENS: THE TEST SPECIMENS, ONE FROM EACH SAMPLE LENGTH OF ROD SHALL BE 1 INCH IN LENGTH FOR RODS 1 INCH OR LESS IN DIAMETER, AND 1/2 INCH IN LENGTH FOR LARGER DIAMETER RODS. THE DIAMETER OF THE SPECIMEN SHALL BE IN THE DIAMETER OF THE FINISHED ROD. THE TEST SPECIMENS, ONE FROM EACH SAMPLE LENGTH OF TUBE, SHALL BE THE FULL SECTION OF THE TUBE AND 1 INCH IN LENGTH FOR TUBES LESS THAN 3 INCHES IN OUTSIDE DIAMETER. FOR TUBES 3 INCHES OR MORE IN OUTSIDE DIAMETER, A RECTANGULAR SPECIMEN SHALL BE CUT 3 INCHES IN LENGTH IN THE CIRCUMFERENTIAL DIRECTION OF THE TUBE AND 1 INCH IN WIDTH LENGTHWISE OF THE TUBE.
       - (b) PROCEDURE: THE SPECIMENS SHALL BE INDIVIDUALLY WEIGHED AND THEN SUBJECTED TO 105° ± 2°C FOR 60 + 6, -0 MINUTES, COOLED IN A DESSICATOR FOR AT LEAST 2 HOURS, AND REWEIGHED (W_1). THE SPECIMENS SHALL THEN BE IMMERSED IN DISTILLED WATER FOR 24 ± 1 HOURS AT 23° ± 2°C. THEY SHALL BE REMOVED INDIVIDUALLY AS NEEDED, ALL SURFACES WIPED OFF WITH A DAMP CLOTH, AND THEN REWEIGHED IMMEDIATELY (W_2). THE TEST SHALL BEGIN WITHIN 1 MINUTE AFTER REMOVAL OF THE SPECIMENS FROM THE WATER AND SHALL BE COMPLETED AS RAPIDLY AS CONSISTENT WITH ACCURACY. SPECIMENS 1/16 INCH OR LESS IN THICKNESS SHALL BE PLACED IN A WEIGHING BOTTLE IMMEDIATELY AFTER WIPING AND SHALL BE WEIGHED IN THE BOTTLE. NO CORRECTION SHALL BE MADE FOR WATER SOLUBLE MATTER. THE PERCENTAGE OF WATER ABSORPTION SHALL BE CALCULATED IN THE FOLLOWING MANNER:

$$\text{PERCENT OF WATER ABSORPTION IN 24 HOURS} = \frac{W_2 - W_1}{W_1} \times 100$$

PROCURE ONLY FROM APPROVED SOURCE LISTED
IN ND 1002034 FOR THIS DRAWING.

RODS (GEE MATERIAL)	
DASH NO.	NOMINAL DIA
1010692-1	NOT AVAILABLE
-2	NOT AVAILABLE
-3	NOT AVAILABLE
-4	NOT AVAILABLE
-5	5/32
-6	3/16
-7	7/32
-8	1/4
-9	9/32
-10	5/16
-11	11/32
-12	3/8
-13	13/32
-14	7/16
-15	15/32
-16	1/2
-17	17/32

RODS (GEE MATERIAL)	
DASH NO.	NOMINAL DIA
1010692-18	9/16
-19	19/32
-20	5/8
-21	21-32
-22	11/16
-23	23/32
-24	3/4
-25	25/32
-26	13/16
-27	27/32
-28	7/8
-29	29/32
-30	15/16
-31	31/32
-32	1"

—	—	—
SHEET 1	SHEET 2	SHEET 3
REVISION STATUS OF SHEETS		

TABLE I

PHYSICAL PROPERTIES FOR MOLDED RODS				
PROPERTY	TEST METHOD	DIAMETER (INCH)	VALUE	
			GEE	
WATER ABSORPTION (%, MAX)	1	1/4 TO 1/2 1/2 TO 2 INCL.	0.75 0.50	
COMPRESSIVE STRENGTH AXIALLY (PSI, MIN)	2	ALL	35,000	
FLEXURAL STRENGTH (PSI, MIN)	ASTM D349	UP TO 1	35,000	
SPECIFIC GRAVITY (MIN)	METHOD 5011 OR 5012 OF STANDARD L-P-406	ALL	1.70	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
NONE

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS 9-497

DRAWN J. Parks DATE 1OCT63
CHECKED 3OCT63
APPROVAL D. R. Test 18 NOV 63
APPROVAL

NASA APPROVAL Jack Bomm

MIT APPROVAL I Hafd 11/19/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LAMINATED PLASTIC,
THERMOSETTING,
GLASS CLOTH EPOXY RESIN

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.	
	C	1010692	
SCALE NONE	WT		SHEET 1 OF 3

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04694	11/19/63	

(4) TEST METHOD 2:

(a) COMPRESSION (RODS AND TUBES): THE AXIAL COMPRESSION STRENGTH OF THE RODS AND TUBES SHALL BE TESTED IN ACCORDANCE WITH METHOD 1021 OF SPECIFICATION L-P-406 EXCEPT THAT THE LENGTH OF THE SPECIMENS SHALL BE AS SPECIFIED IN TABLE III.

(5) TEST METHOD 3:

(a) SPECIMENS: THE TEST SPECIMENS SHALL BE 12 INCHES LONG. THE TEST SPECIMENS SHALL BE EQUIPPED WITH THE ELECTRODES AS SPECIFIED IN TABLE IV.

(b) PROCEDURE: THE DIELECTRIC STRENGTH PERPENDICULAR TO THE LAMINATION SHALL BE DETERMINED BY THE SHORT-TIME TEST AS SPECIFIED IN METHOD 4031 OF SPECIFICATION L-P-406. THE TESTS SHALL BE MADE UNDER OIL AT A FREQUENCY NOT EXCEEDING 100 CPS. THE VOLTAGE IN THE SHORT-TIME TEST SHALL BE INCREASED IN INCREMENTS OF 500V/SEC.

3. DESIGN REQUIREMENTS:

A. RODS AND TUBES:

(1) LENGTH: THE SUPPLIER'S STANDARD LENGTH, ± 1 INCH SHALL BE ACCEPTABLE.

(2) DIAMETER AND WALL THICKNESS: THE DIAMETER OF MOLDED RODS AND THE INSIDE DIAMETER OUTSIDE DIAMETER, AND WALL THICKNESS SHALL BE AS SPECIFIED.

(3) TOLERANCES ON ROD DIAMETER: TOLERANCE ON MOLDED RODS SHALL BE AS LISTED IN TABLE V, UNLESS OTHERWISE SPECIFIED.

(4) TOLERANCES ON DIAMETERS OF TUBES: UNLESS OTHERWISE SPECIFIED, TUBE DIAMETERS SHALL HAVE THE TOLERANCE LISTED IN TABLE VI.

(5) FINISH:

(a) RODS AND TUBES: BUFFED, UNLESS OTHERWISE SPECIFIED.

(6) MACHINABILITY: THE MATERIAL SHALL BE SUCH THAT IT CAN BE DRILLED, TAPPED, SAWED, AND MACHINED IN ALL DIRECTIONS IN ACCORDANCE WITH THE SUPPLIER'S RECOMMENDED TECHNIQUE WITHOUT CRACKING, SPLITTING, OR OTHERWISE IMPAIRING THE MATERIAL FOR GENERAL USE.

TABLE II

PROPERTIES FOR ROUND ROLLED TUBES

PROPERTY	TEST METHOD	WALL THICKNESS (INCH)	VALUE	
			GEE	
SPECIFIC GRAVITY (MIN)	METHOD 5011 OR 5012 OF STANDARD L-P-406	1/8 - 1/2 1/2 - 8	1.65 1.70	
WATER ABSORPTION (% MAX)	1	1/32 - 1/16 1/16 - 3/32 3/32 - 1/8 1/8 - 3/16 3/16 - 1/4 1/4 - 1	1.0 0.8 0.7 0.6 0.5 0.4	
COMPRESSIVE STRENGTH (PSI, MIN)	2	1/16 UP	20,000	
DIELECTRIC STRENGTH (V/MIL, MIN)	3	1/32 - 1/16 1/16 - 1/8 1/8 - 1/4 1/4 - 1/2	350 250 200 150	
TENSILE STRENGTH (PSI, MIN)	METHOD 1011 OF STANDARD L-P-406		20,000	

TUBES (GEE MATERIAL)

DASH NO.	NOMINAL	
	ID	OD
1010692-201	1/8	1/4

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS.
DWG. NO.
CONTRACT NAS 9-497
DRAWN J. Parks DATE 1OCT63
CHECKED 3OCT63
APPROVAL D.R. Test 18 NOV 63
APPROVAL
NASA APPROVAL Jack Barnard
MIT APPROVAL 11/19/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LAMINATED PLASTIC,
THERMOSETTING,
GLASS CLOTH EPOXY RESIN
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010692
SCALE NONE
WT
SHEET 2 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
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TABLE III

SPECIMEN LENGTH OF RODS AND TUBES	
OUTSIDE DIAMETER (INCH)	LENGTH (INCH)
RODS	
1/8 TO 1/4, INCL	1/2
ABOVE 1/4 TO 1/2, INCL	1
ABOVE 1/2 TO 1, INCL	2
ABOVE 1 TO 2, INCL	4
TUBES	
UP TO 2, INCL	1

TABLE IV

ELECTRODES FOR DIELECTRIC TESTS OF TUBES		
SPECIMEN ID (INCHES)	INNER ELECTRODE	OTHER ELECTRODE
1.5 OR LESS	MERCURY OR BRASS ROD, 3 INCHES LONG, WITH EDGES ROUNDED TO A 1/4 INCH RADIUS AND OF SUCH DIAMETER THAT IT FITS SNUGLY IN THE TUBE.	METAL FOIL
GREATER THAN 1.5	MERCURY OR METAL FOIL	METAL FOIL

TABLE V

DIAMETER TOLERANCES ON MOLDED RODS	
NOMINAL DIAMETER (INCHES)	PERMISSIBLE VARIATION (± INCH)
1/8 TO 1-15/16, INCL.	0.005
2 TO 4, INCL.	0.008

TABLE VI

DIAMETER TOLERANCES ON ROUND ROLLED TUBES			
NOMINAL DIAMETER (INCHES)	INSIDE DIAMETER (± INCH)		OUTSIDE DIAMETER (± INCH)
	STEEL MANDREL	BUILT-UP MANDREL	
1/8 TO 23/32, INCL.	0.003	-	0.005
3/4 TO 1-15/16, INCL.	0.004	-	0.005
2 TO 4, INCL.	0.008	-	0.008
4-1/8 TO 12, INCL.	0.010	-	0.025 TURNED
12-1/8 TO 18, INCL.	0.030	0.060	0.030
18-1/8 TO 24, INCL.	0.040	0.075	0.035
24-1/8 TO 48, INCL.	0.060	0.090	0.040

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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DWG. NO.
CONTRACT NAS 9-497
DRAWN J. Parks DATE 1 OCT 63
CHECKED Mele Kowalec 3 OCT 63
APPROVAL D. G. Test 18 NOV 63
APPROVAL
NASA APPROVAL Jack Bressman
MIT APPROVAL 11/19/63

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HOUSTON, TEXAS

LAMINATED PLASTIC,
THERMOSETTING,
GLASS CLOTH EPOXY RESIN

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010692
SCALE
WT
SHEET 3 OF 3

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

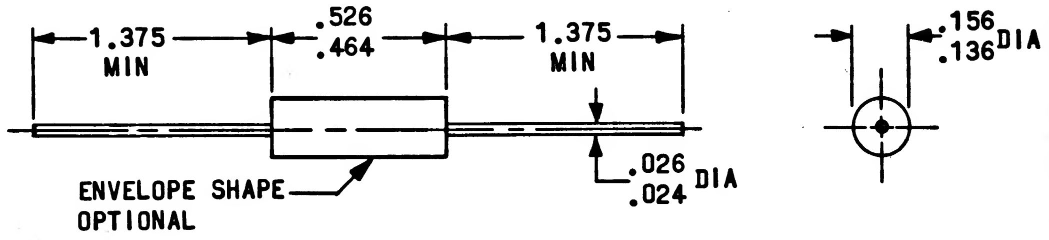
—	1010693

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04955	12/3/63	

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF MIL-R-10509 STYLE RN65, CHARACTERISTIC C, TOLERANCE F; EXCEPT AS SPECIFIED HEREIN.
   - C. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - D. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002057 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - E. PACKAGING PER MIL-R-10509, LEVEL A.
2. INSPECTION AND ACCEPTANCE:
   - A. ELECTRICAL REQUIREMENTS:
     - (1) RESISTANCE VALUES: PER TABLE
     - (2) RESISTANCE TOLERANCE: ±1%
   - B. MECHANICAL REQUIREMENTS:
     - (1) MARKING: THE MANUFACTURER'S NAME OR SYMBOL, THE LAST THREE DIGITS OF NASA DRAWING NUMBER, DASH NUMBER, REVISION LETTER, AND LOT CODE NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER MIL-STD-130. THE MANUFACTURER'S PART OR TYPE NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND SHIPPING CONTAINERS SHALL CONTAIN THE NASA DRAWING NUMBER, THE DASH NUMBER AND THE REVISION LETTER.
   - C. LEADS: IRON-NICKEL ALLOY, COPPER CLAD, GOLD PLATED PER PS 1015401. A CERTIFICATE OF COMPLIANCE OF LEAD MATERIAL SHALL ACCOMPANY EACH LOT SHIPPED.
3. DESIGN REQUIREMENTS:
   - A. PER MIL-R-10509 AS MODIFIED BY THIS DRAWING.
   - B. POWER RATING: 1/4 WATT AT +125°C DERATED LINEARLY TO 175°C
   - C. TEMPERATURE COEFFICIENT: ±50 PPM/°C(-55°C TO +175°C)
   - D. MAX CONTINUOUS WORKING VOLTAGE: 200 VOLTS
   - E. DIELECTRIC WITHSTANDING VOLTAGE: 750 VOLTS RMS
4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. EACH UNIT SHALL BE BURNED-IN FOR 100 HOURS AT RATED POWER AT 125°C. THE RESISTANCE CHANGE SHALL NOT BE MORE THAN 0.5% FROM INITIAL MEASURED VALUE, OR OUT OF INITIAL TOLERANCE, BEFORE AND AFTER BURN-IN.

NOTE: FOR USE IN MOLDED MODULES ONLY.



—	—
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

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DWG. NO. Contract NAS 9-497
DRAWN ORZEL DATE 9-OCT-63
CHECKED C. WILSON 14-OCT-63
APPROVAL D. A. Test 3-DEC-63
APPROVAL
NASA APPROVAL W. J. 12-3-63
MIT APPROVAL 12/3/63

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.	
	C	1010693	
SCALE NONE	WT		SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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—	1010693

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04955	[illegible]	

BASIC RESISTANCE OHMS	MULTIPLIER					
	1	10	10^2	10^3	10^4	10^5
	NASA DASH NUMBER					
10.0		30	126	222	318	414
10.2		31	127	223	319	
10.5		32	128	224	320	
10.7		33	129	225	321	
11.0		34	130	226	322	
11.3		35	131	227	323	
11.5		36	132	228	324	
11.8		37	133	229	325	
12.1		38	134	230	326	
12.4		39	135	231	327	
12.7		40	136	232	328	
13.0		41	137	233	329	
13.3		42	138	234	330	
13.7		43	139	235	331	
14.0		44	140	236	332	
14.3		45	141	237	333	
14.7		46	142	238	334	
15.0		47	143	239	335	
15.4		48	144	240	336	
15.8		49	145	241	337	
16.2		50	146	242	338	
16.5		51	147	243	339	
16.9		52	148	244	340	
17.4		53	149	245	341	
17.8		54	150	246	342	
18.2		55	151	247	343	
18.7		56	152	248	344	
19.1		57	153	249	345	
19.6		58	154	250	346	
20.0		59	155	251	347	
20.5		60	156	252	348	
21.0		61	157	253	349	
21.5		62	158	254	350	
22.1		63	159	255	351	
22.6		64	160	256	352	
23.2		65	161	257	353	
23.7		66	162	258	354	
24.3		67	163	259	355	
24.9		68	164	260	356	
25.5		69	165	261	357	
26.1		70	166	262	358	
26.7		71	167	263	359	
27.4		72	168	264	360	
28.0		73	169	265	361	
28.7		74	170	266	362	
29.4		75	171	267	363	
30.1		76	172	268	364	
30.9		77	173	269	365	
31.6		78	174	270	366	
32.4		79	175	271	367	
33.2		80	176	272	368	

BASIC RESISTANCE OHMS	MULTIPLIER				
	1	10	10^2	10^3	10^4
	NASA DASH NUMBER				
34.0		81	177	273	369
34.8		82	178	274	370
35.7		83	179	275	371
36.5		84	180	276	372
37.4		85	181	277	373
38.3		86	182	278	374
39.2		87	183	279	375
40.2		88	184	280	376
41.2		89	185	281	377
42.2		90	186	282	378
43.2		91	187	283	379
44.2		92	188	284	380
45.3		93	189	285	381
46.4		94	190	286	382
47.5		95	191	287	383
48.7		96	192	288	384
49.9	1	97	193	289	385
51.1	2	98	194	290	386
52.3	3	99	195	291	387
53.6	4	100	196	292	388
54.9	5	101	197	293	389
56.2	6	102	198	294	390
57.6	7	103	199	295	391
59.0	8	104	200	296	392
60.4	9	105	201	297	393
61.9	10	106	202	298	394
63.4	11	107	203	299	395
64.9	12	108	204	300	396
66.5	13	109	205	301	397
68.1	14	110	206	302	398
69.8	15	111	207	303	399
71.5	16	112	208	304	400
73.2	17	113	209	305	401
75.0	18	114	210	306	402
76.8	19	115	211	307	403
78.7	20	116	212	308	404
80.6	21	117	213	309	405
82.5	22	118	214	310	406
84.5	23	119	215	311	407
86.6	24	120	216	312	408
88.7	25	121	217	313	409
90.9	26	122	218	314	410
93.1	27	123	219	315	411
95.3	28	124	220	316	412
97.6	29	125	221	317	413

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN Orzel DATE 9 OCT 63
CHECKED C. Wilson 14 OCT 63
APPROVAL 3 DEC 63
APPROVAL
NASA APPROVAL W. J. 12-3-63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, FILM

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010693
SCALE NONE	WT	SHEET 2 OF 2

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

—	1010694

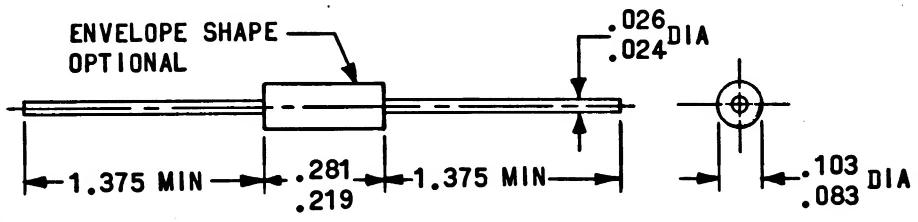
REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04955	12/3/63	JW

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARD PRESCRIBED IN MIL-D-70327.
   - B. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF MIL-R-10509 STYLE 55, CHARACTERISTIC C, TOLERANCE F; EXCEPT AS SPECIFIED HEREIN.
   - C. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - D. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002057 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - E. UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH ND 1002129.
2. INSPECTION AND ACCEPTANCE:
   - A. ELECTRICAL REQUIREMENTS:
     - (1) RESISTANCE VALUES: PER TABLE
     - (2) RESISTANCE TOLERANCE: ±1%
   - B. MECHANICAL REQUIREMENTS:
     - (1) MARKING: THE MANUFACTURER'S NAME OR SYMBOL, THE LAST THREE DIGITS OF THE NASA DRAWING NUMBER, DASH NUMBER, REVISION LETTER, AND LOT CODE NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER MIL-STD-130. THE MANUFACTURER'S PART OR TYPE NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND SHIPPING CONTAINERS SHALL CONTAIN THE NASA DRAWING NUMBER, THE DASH NUMBER AND THE REVISION LETTER.
     - (2) LEADS: IRON-NICKEL ALLOY, COPPER CLAD, GOLD PLATED PER PS 1015401. A CERTIFICATE OF COMPLIANCE OF LEAD MATERIAL SHALL ACCOMPANY EACH LOT SHIPPED.
3. DESIGN REQUIREMENTS:
   - A. PER MIL-R-10509 AS MODIFIED BY THIS DRAWING.
   - B. POWER RATING: 1/10 WATT AT +125°C DERATED LINEARLY TO 175°C
   - C. TEMPERATURE COEFFICIENT: ±50 PPM/°C (-55°C TO +175°C)
   - D. MAX CONTINUOUS WORKING VOLTAGE: 200 VOLTS
   - E. DIELECTRIC WITHSTANDING VOLTAGE: 750 VOLTS RMS
4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. EACH UNIT SHALL BE BURNED-IN FOR 100 HOURS AT RATED POWER AT 125°C. THE RESISTANCE CHANGE SHALL NOT BE MORE THAN 0.5% FROM INITIAL MEASURED VALUE, OR OUT OF INITIAL TOLERANCE BEFORE AND AFTER BURN-IN.

NOTE: FOR USE IN MOLDED MODULES ONLY.



THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER

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SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

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NEXT ASSY	USED ON
APPLICATION	

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN ORZEL DATE 9-OCT-63
CHECKED W. Buhl 15 OCT '63
APPROVAL 3 DEC 63
APPROVAL
NASA APPROVAL W. J. Rhine 12-3-63
MIT APPROVAL 12/3/63

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010694
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVAL
	INITIAL RELEASE CLASS A PER TDRR 04955	12/3/63	

REVISIONS

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BASIC RESISTANCE OHMS	MULTIPLIER 1	10	10^2	10^3	10^4
	NASA DASH NUMBER				
10.0		30	126	222	318
10.2		31	127	223	319
10.5		32	128	224	320
10.7		33	129	225	321
11.0		34	130	226	322
11.3		35	131	227	323
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12.7		40	136	232	328
13.0		41	137	233	329
13.3		42	138	234	330
13.7		43	139	235	331
14.0		44	140	236	332
14.3		45	141	237	333
14.7		46	142	238	334
15.0		47	143	239	335
15.4		48	144	240	336
15.8		49	145	241	337
16.2		50	146	242	338
16.5		51	147	243	339
16.9		52	148	244	340
17.4		53	149	245	341
17.8		54	150	246	342
18.2		55	151	247	343
18.7		56	152	248	344
19.1		57	153	249	345
19.6		58	154	250	346
20.0		59	155	251	347
20.5		60	156	252	
21.0		61	157	253	
21.5		62	158	254	
22.1		63	159	255	
22.6		64	160	256	
23.2		65	161	257	
23.7		66	162	258	
24.3		67	163	259	
24.9		68	164	260	
25.5		69	165	261	
26.1		70	166	262	
26.7		71	167	263	
27.4		72	168	264	
28.0		73	169	265	
28.7		74	170	266	
29.4		75	171	267	
30.1		76	172	268	
30.9		77	173	269	
31.6		78	174	270	
32.4		79	175	271	
33.2		80	176	272	

BASIC RESISTANCE OHMS	MULTIPLIER 1	10	10^2	10^3	10^4
	NASA DASH NUMBER				
34.0		81	177	273	
34.8		82	178	274	
35.7		83	179	275	
36.5		84	180	276	
37.4		85	181	277	
38.3		86	182	278	
39.2		87	183	279	
40.2		88	184	280	
41.2		89	185	281	
42.2		90	186	282	
43.2		91	187	283	
44.2		92	188	284	
45.3		93	189	285	
46.4		94	190	286	
47.5		95	191	287	
48.7		96	192	288	
49.9	1	97	193	289	
51.1	2	98	194	290	
52.3	3	99	195	291	
53.6	4	100	196	292	
54.9	5	101	197	293	
56.2	6	102	198	294	
57.6	7	103	199	295	
59.0	8	104	200	296	
60.4	9	105	201	297	
61.9	10	106	202	298	
63.4	11	107	203	299	
64.9	12	108	204	300	
66.5	13	109	205	301	
68.1	14	110	206	302	
69.8	15	111	207	303	
71.5	16	112	208	304	
73.2	17	113	209	305	
75.0	18	114	210	306	
76.8	19	115	211	307	
78.7	20	116	212	308	
80.6	21	117	213	309	
82.5	22	118	214	310	
84.5	23	119	215	311	
86.6	24	120	216	312	
88.7	25	121	217	313	
90.9	26	122	218	314	
93.1	27	123	219	315	
95.3	28	124	220	316	
97.6	29	125	221	317	

THE COMPLETE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS-9-497
DRAWN 9 OCT 63 DATE
CHECKED W. Diehl 15 OCT '63
APPROVAL 3 DEC 63
APPROVAL
NASA APPROVAL 12-3-63
MIT APPROVAL Hazel 12/3/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, FILM

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010694
SCALE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

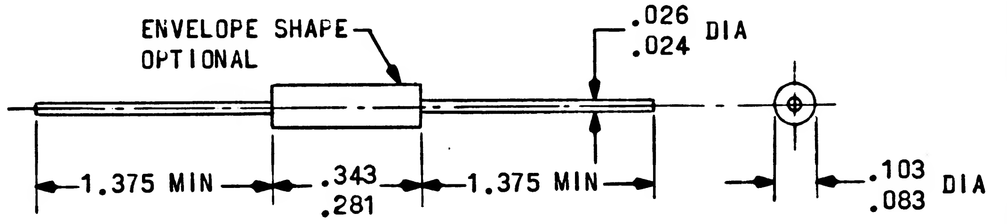
1010695 A

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04955	12/3/63	
A	REVISED PER TDRR 06707	3/10/64	WK

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-S-70327.
   - B. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF MIL-R-10509 STYLE RN60, CHARACTERISTIC C, TOLERANCE F: EXCEPT AS SPECIFIED HEREIN.
   - C. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - D. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002057 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - E. UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH ND 1002129.
2. INSPECTION AND ACCEPTANCE:
   - A. ELECTRICAL REQUIREMENTS
     - (1) RESISTANCE VALUES: PER TABLE
     - (2) RESISTANCE TOLERANCE: ±1%
   - B. MECHANICAL REQUIREMENTS:
     - (1) MARKING: THE MANUFACTURER'S NAME OR SYMBOL, THE LAST THREE DIGITS OF THE NASA DRAWING NUMBER, DASH NUMBER, REVISION LETTER, AND LOT CODE NUMBER, SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND1002019. THE MANUFACTURER'S PART OR TYPE NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND SHIPPING CONTAINERS SHALL CONTAIN THE NASA DRAWING NUMBER, THE DASH NUMBER AND THE REVISION LETTER, PER MIL-STD-129.
     - (2) LEADS: IRON-NICKEL ALLOY, COPPER CLAD, GOLD PLATED PER PS 1015401. A CERTIFICATE OF COMPLIANCE OF LEAD MATERIAL SHALL ACCOMPANY EACH LOT SHIPPED.
3. DESIGN REQUIREMENTS:
   - A. PER MIL-R-10509 AS MODIFIED BY THIS DRAWING.
   - B. POWER RATING: 1/8 WATT AT +125°C DERATED LINEARLY TO 175°C
   - C. TEMPERATURE COEFFICIENT: ±50 PPM/°C (-55°C TO +175°C) QUALIFY PER MIL-R-10509.
   - D. MAX CONTINUOUS WORKING VOLTAGE: 200 VOLTS
   - E. DIELECTRIC WITHSTANDING VOLTAGE: 750 VOLTS RMS
4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. EACH UNIT SHALL BE BURN-IN FOR 100 HOURS AT RATED POWER AT 125°C. THE RESISTANCE CHANGE SHALL NOT BE MORE THAN 0.5% FROM INITIAL MEASURED VALUE, OR OUT OF INITIAL TOLERANCE, BEFORE AND AFTER BURN-IN.



NOTE:
1. FOR USE IN MOLDED MODULES ONLY.

A	—
—	—
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO Contract NAS 9-497
DRAWN J. Rinks DATE 15NOV63
CHECKED C Wilson 15NOV63
APPROVAL D. R. Test 3 DEC 63
APPROVAL
NASA APPROVAL W. J. Rhine 12-3-63
MIT APPROVAL I Nagel 12/3/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, FILM

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010695
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

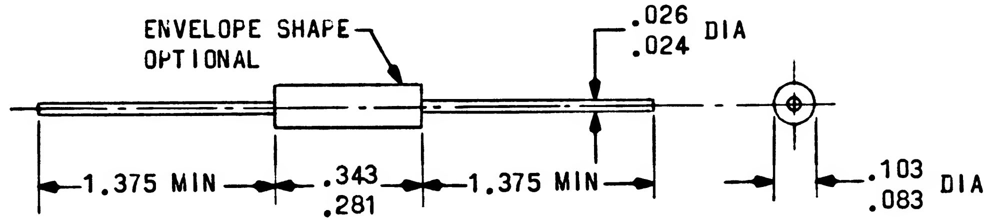
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

—	1010695

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04955	12/3/63	[illegible]

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-S-70327.
   - B. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF MIL-R-10509 STYLE RN60, CHARACTERISTICS C, TOLERANCE F: EXCEPT AS SPECIFIED HEREIN.
   - C. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - D. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002057 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - E. UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH ND 1002129.
2. INSPECTION AND ACCEPTANCE:
   - A. ELECTRICAL REQUIREMENTS
     - (1) RESISTANCE VALUES: PER TABLE
     - (2) RESISTANCE TOLERANCE: ±1%
   - B. MECHANICAL REQUIREMENTS:
     - (1) MARKING: THE MANUFACTURER'S NAME OR SYMBOL, THE LAST THREE DIGITS OF THE NASA DRAWING NUMBER, DASH NUMBER, REVISION LETTER, AND LOT CODE NUMBER, SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER MIL-STD-130. THE MANUFACTURER'S PART OR TYPE NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND SHIPPING CONTAINERS SHALL CONTAIN THE NASA DRAWING NUMBER, THE DASH NUMBER AND THE REVISION LETTER.
     - (2) LEADS: IRON-NICKEL ALLOY, COPPER CLAD, GOLD PLATED PER PS 1015401. A CERTIFICATE OF COMPLIANCE OF LEAD MATERIAL SHALL ACCOMPANY EACH LOT SHIPPED.
3. DESIGN REQUIREMENTS:
   - A. PER MIL-R-10509 AS MODIFIED BY THIS DRAWING.
   - B. POWER RATING: 1/8 WATT AT +125°C DERATED LINEARLY TO 175°C
   - C. TEMPERATURE COEFFICIENT: ±50 PPM/°C (-55°C TO +175°C)
   - D. MAX CONTINUOUS WORKING VOLTAGE: 200 VOLTS
   - E. DIELECTRIC WITHSTANDING VOLTAGE: 750 VOLTS RMS
4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. EACH UNIT SHALL BE BURN-IN FOR 100 HOURS AT RATED POWER AT 125°C. THE RESISTANCE CHANGE SHALL NOT BE MORE THAN 0.5% FROM INITIAL MEASURED VALUE, OR OUT OF INITIAL TOLERANCE, BEFORE AND AFTER BURN-IN.



NOTE:
1. FOR USE IN MOLDED MODULES ONLY.

—	—
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
Contract NAS 9-497

DRAWN [illegible] DATE 15NOV63
CHECKED C Wilson 15NOV63
APPROVAL D. R. Test 3 DEC 63
APPROVAL

NASA APPROVAL W. J. Rhine 12-3-63
MIT APPROVAL [illegible] 12/3/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, FILM

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010695
SCALE NONE WT SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

—	1010695

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04955	12/3/6	

BASIC RESISTANCE OHMS	MULTIPLIER				
	1	10	10^2	10^3	10^4
	NASA DASH NUMBER				
10.0		30	126	222	318
10.2		31	127	223	319
10.5		32	128	224	320
10.7		33	129	225	321
11.0		34	130	226	322
11.3		35	131	227	323
11.5		36	132	228	324
11.8		37	133	229	325
12.1		38	134	230	326
12.4		39	135	231	327
12.7		40	136	232	328
13.0		41	137	233	329
13.3		42	138	234	330
13.7		43	139	235	331
14.0		44	140	236	332
14.3		45	141	237	333
14.7		46	142	238	334
15.0		47	143	239	335
15.4		48	144	240	336
15.8		49	145	241	337
16.2		50	146	242	338
16.5		51	147	243	339
16.9		52	148	244	340
17.4		53	149	245	341
17.8		54	150	246	342
18.2		55	151	247	343
18.7		56	152	248	344
19.1		57	153	249	345
19.6		58	154	250	346
20.0		59	155	251	347
20.5		60	156	252	348
21.0		61	157	253	349
21.5		62	158	254	350
22.1		63	159	255	351
22.6		64	160	256	352
23.2		65	161	257	353
23.7		66	162	258	354
24.3		67	163	259	355
24.9		68	164	260	356
25.5		69	165	261	357
26.1		70	166	262	358
26.7		71	167	263	359
27.4		72	168	264	360
28.0		73	169	265	361
28.7		74	170	266	362
29.4		75	171	267	363
30.1		76	172	268	364
30.9		77	173	269	365
31.6		78	174	270	366
32.4		79	175	271	367
33.2		80	176	272	368

BASIC RESISTANCE OHMS	MULTIPLIER				
	1	10	10^2	10^3	10^4
	NASA DASH NUMBER				
34.0		81	177	273	369
34.8		82	178	274	370
35.7		83	179	275	371
36.5		84	180	276	372
37.4		85	181	277	373
38.3		86	182	278	374
39.2		87	183	279	375
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41.2		89	185	281	377
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43.2		91	187	283	379
44.2		92	188	284	380
45.3		93	189	285	381
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48.7		96	192	288	384
49.9	1	97	193	289	385
51.1	2	98	194	290	
52.3	3	99	195	291	
53.6	4	100	196	292	
54.9	5	101	197	293	
56.2	6	102	198	294	
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59.8	8	104	200	296	
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63.4	11	107	203	299	
64.9	12	108	204	300	
66.5	13	109	205	301	
68.1	14	110	206	302	
69.8	15	111	207	303	
71.5	16	112	208	304	
73.2	17	113	209	305	
75.0	18	114	210	306	
76.8	19	115	211	307	
78.7	20	116	212	308	
80.6	21	117	213	309	
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84.5	23	119	215	311	
86.6	24	120	216	312	
88.7	25	121	217	313	
90.9	26	122	218	314	
93.1	27	123	219	315	
95.3	28	124	220	316	
97.6	29	125	221	317	

THE COMPLETE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS-9-497
DRAWN Ozzel DATE 3 OCT 63
CHECKED C. Wilson 15 Nov 63
APPROVAL A. B. Test 3 DEC 63
APPROVAL
NASA APPROVAL W J Rhine 12-3-63
MIT APPROVAL 12/3/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, FILM

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010695
SCALE	WT	SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

∀ 9690101

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04472	5 Nov 63	WK
A	REVISED PER TDRR 05830	21 Jan 64	WK

REQUIREMENTS:

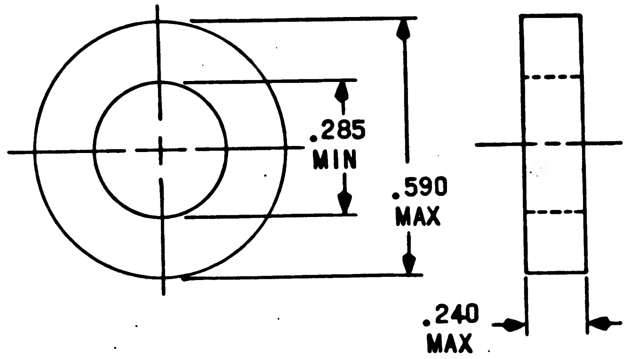
1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN SPECIFICATION ND 1015404, CLASS 3.
2. INSPECTION AND ACCEPTANCE:
   - A. MARKING: MARK PERMANENTLY AND LEGIBLY WITH THE NASA DRAWING NUMBER, REVISION LETTER AND THE MANUFACTURER'S NAME OR SYMBOL. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE PER MIL-STD-129.
   - B. CASED CORES SHALL BE SUPPLIED WITH A COATING WHICH WILL WITHSTAND 1000 VOLTS RMS MINIMUM BREAKDOWN VOLTAGE FROM CASE TO WINDING. TEMPERATURE RATING OF COATING -65°C TO +200°C.
   - C. CORE BOXES SHALL BE FILLED WITH DOW CORNING NO. 4 GREASE OR EQUIVALENT, SUCH THAT VOIDS, VISIBLE WHEN THE CORE BOX COVER IS REMOVED, SHALL CONSTITUTE NOT MORE THAN 10% OF THE PERIPHERAL VOLUME BETWEEN THE CORE BOX AND MAGNETIC CORE AND NOT MORE THAN 20% OF THE VOLUME BETWEEN THE CORE BOX COVER AND THE MAGNETIC CORE. (SAMPLE INSPECTION).
   - D. CORE SHALL MEET REQUIREMENTS OF TABLE I.
3. DESIGN REQUIREMENTS:
   - A. CASE MATERIAL: ALUMINUM
   - B. CORE: TAPE WOUND
   - C. TAPE THICKNESS: 0.002"
   - D. CORE MATERIAL: 79% NICKEL IRON
   - E. CORE SIZE (FOR REFERENCE): O.D.= 0.500, I.D.= 0.375, HEIGHT= 0.125.
   - F. MEAN LENGTH OF MAGNETIC PATH: 3.49 CENTIMETERS

TABLE I PARAMETERS (NOTE: 1 AND 2)

B_M MAXIMUM FLUX DENSITY KILOGAUSSES	B_M-B_R DIFFERENTIAL FLUX DENSITY KILOGAUSSES	A_C EFFECTIVE CORE AREA (FOR REF) SQ. CM.	B_2-B_1 CORE GAIN FLUX DENSITY RANGE KILOGAUSSES	400 CPS TEST		NOMINAL CORE WEIGHT GRAM
				H_C MAGNETIC INTENSITY FOR $B_M/2$ RESET OERSTED	H_R MAGNETIC INTENSITY FOR B_2-B_1 RESET OERSTED	
6.9-7.9	0.02-.20 B_M	0.043	5.0	0.020-0.040	0.0035-0.007	1.4

NOTE 1: IN ANY PARTICULAR SHIPMENT OF CORES THE VALUE OF EACH PARAMETER TESTED SHALL BE SUCH THAT THE DIFFERENCE BETWEEN THE LOWEST VALUE AND THE HIGHEST VALUE MUST BE LESS THAN OR EQUAL TO ONE HALF THE TOTAL RANGE INDICATED IN THE PARTICULAR PARAMETER TABLULATION.

NOTE 2: ALL MAGNETIC CORE PARAMETERS DESIGNATED ARE FOR SINUSOIDAL CURRENT EXCITATION AND DIRECT CURRENT RESET TESTING PER AIEE STANDARD CORE TEST METHOD PAPER NO. 432.



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN D. Dolbert DATE 25 OCT 63
CHECKED C. Wilson 28 Oct 63
APPROVAL B. Katz 5 NOV 63
APPROVAL
NASA APPROVAL
MIT APPROVAL WKoff 5 Nov 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CORE - TOROIDAL
TAPE WOUND

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010696
SCALE NONE WT SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

—	9690101

REVISIONS

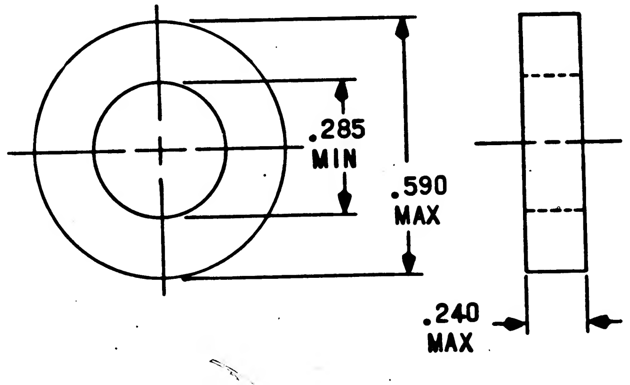
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04472	5 NOV 63	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN SPECIFICATION ND 1015404, CLASS 3.
2. INSPECTION AND ACCEPTANCE:
   - A. MARKING: MARK PERMANENTLY AND LEGIBLY WITH THE NASA DRAWING NUMBER, REVISION LETTER AND THE MANUFACTURER'S NAME OR SYMBOL. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.
   - B. CASED CORES SHALL BE SUPPLIED WITH A COATING WHICH WILL WITHSTAND 1000 VOLTS RMS MINIMUM BREAKDOWN VOLTAGE FROM CASE TO WINDING. TEMPERATURE RATING OF COATING -65°C TO +200°C.
   - C. CORE BOXES SHALL BE FILLED WITH DOW CORNING NO. 4 GREASE OR EQUIVALENT, SUCH THAT VOIDS, VISIBLE WHEN THE CORE BOX COVER IS REMOVED, SHALL CONSTITUTE NOT MORE THAN 10% OF THE PERIPHERAL VOLUME BETWEEN THE CORE BOX AND MAGNETIC CORE AND NOT MORE THAN 20% OF THE VOLUME BETWEEN THE CORE BOX COVER AND THE MAGNETIC CORE. (SAMPLE INSPECTION).
   - D. CORE SHALL MEET REQUIREMENTS OF TABLE I.
3. DESIGN REQUIREMENTS:
   - A. CASE MATERIAL: ALUMINUM
   - B. CORE: TAPE WOUND
   - C. TAPE THICKNESS: 0.002"
   - D. CORE MATERIAL: 79% NICKEL IRON
   - E. CORE SIZE (FOR REFERENCE): O.D.= 0.500, I.D.= 0.375, HEIGHT= 0.125.
   - F. MEAN LENGTH OF MAGNETIC PATH: 3.49 CENTIMETERS

TABLE I PARAMETERS (NOTE: 1 AND 2)

B_M MAXIMUM FLUX DENSITY KILOGAUSSES	B_M-B_R DIFFERENTIAL FLUX DENSITY KILOGAUSSES	A_C EFFECTIVE CORE AREA (FOR REF) SQ. CM.	B_2-B_1 CORE GAIN FLUX DENSITY RANGE KILOGAUSSES	400 CPS TEST: H_C MAGNETIC INTENSITY FOR $B_M/2$ RESET OERSTED	400 CPS TEST: H_R MAGNETIC INTENSITY FOR B_2-B_1 RESET OERSTED	NOMINAL CORE WEIGHT GRAM
6.9-7.9	0.02-.20 B_M	0.043	5.0	0.020-0.040	0.0035-0.007	1.4



NOTE 1: IN ANY PARTICULAR SHIPMENT OF CORES THE VALUE OF EACH PARAMETER TESTED SHALL BE SUCH THAT THE DIFFERENCE BETWEEN THE LOWEST VALUE AND THE HIGHEST VALUE MUST BE LESS THAN OR EQUAL TO ONE HALF THE TOTAL RANGE INDICATED IN THE PARTICULAR PARAMETER TABLULATION.

NOTE 2: ALL MAGNETIC CORE PARAMETERS DESIGNATED ARE FOR SINUSOIDAL CURRENT EXCITATION AND DIRECT CURRENT RESET TESTING PER AIEE PROPOSED STANDARD CORE TESTING METHODS TRANSACTIONS PAPER NO. 58-71, FEBRUARY 19, 1958.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
Contract NAS 9-497
DRAWN S. Dobbert DATE 25 OCT 63
CHECKED C. Wilson 28 Oct 63
APPROVAL B. Katz 5 NOV 63
APPROVAL
NASA APPROVAL
MIT APPROVAL WKopp 5 NOV 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CORE - TOROIDAL
TAPE WOUND

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010696
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

—	1010700

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05618	1/7/64	RK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATION ND-1015404, CLASS 3.
   - C. EACH UNIT AND SHIPPING CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS, LOT NUMBER, DATE OF MANUFACTURE, AND EXPIRATION DATE FOR UNOPENED CONTAINERS.
2. INSPECTION AND ACCEPTANCE:
   - A. UNCURED RESIN:

(1) COLOR:	CLEAR, COLORLESS	
(2) VISCOSITY:	800-1500 CENTIPOISES.	BROOKFIELD MODEL RVF WITH NO. 2 SPINDLE AT 20 RPM AT 25±1/2°C
(3) SILICONE SOLIDS:	99% NON-VOLATILES, MIN.	HEAT APPROX. 50 GMS OF RESIN IN A 100 ML BEAKER FOR 3 HOURS AT 150°C IN AN AIR CIRCULATING OVEN.

   - B. USABLE POT LIFE: 20 MINUTES MINIMUM.
   - C. CURED MATERIAL: WHEN COMPOUNDED WITH 0.5% OF CATALYST 1010701 BY WEIGHT, AND CURED FOR 4 HOURS. AT 70°C ± 3°C, IT SHALL PRODUCE A MATERIAL WITH THE FOLLOWING PROPERTIES.
     - (1) COLOR: CLEAR, COLORLESS
     - (2) DUROMETER, SHORE A: 10 MINIMUM PER ASTM-D-676
3. DESIGN REQUIREMENTS:
   - A. MATERIAL: CLEAR SILICONE POTTING AND ENCAPSULATING RESIN.
   - B. SHELF LIFE: WHEN STORED AT ROOM TEMPERATURE THIS MATERIAL SHALL HAVE A MINIMUM OF 4 MONTHS USABLE SHELF LIFE WHEN RECEIVED.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND-1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO.
CONTRACT NAS 9-497

DRAWN J. PATTERSON DATE 21 OCT 63
CHECKED C. WILSON 23 OCT 63
APPROVAL S. C. Smith
APPROVAL
NASA APPROVAL J Barnard
MIT APPROVAL W Kupfer 7 Jan 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SILICONE POTTING COMPOUND, RESIN

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	C	1010700

SCALE NONE WT SHEET 1 OF 1

1010700 —

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PBR

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

— 1010701

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05618	1/7/64	

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
   - C. EACH UNIT AND SHIPPING CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS, LOT NUMBER, DATE OF MANUFACTURE AND EXPIRATION DATE FOR UNOPENED CONTAINERS.
2. ACCEPTANCE AND INSPECTION REQUIREMENTS:
   - A. MATERIAL: LIQUID AMINE CATALYST
   - B. COLOR: STRAW, GARDNER 0 TO 3 ASTM D-1544
3. DESIGN REQUIREMENTS:
   - A. CURED MATERIAL: WHEN COMPOUNDED AND CURED AS SPECIFIED IN 1010700, THE CURED MATERIAL SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF 1010700.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
SEE REQUIREMENTS
HEAT TREATMENT
NONE
FINAL FINISH
NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT NAS 9-497
DRAWN J. PARKS DATE 18-NOV-63
CHECKED W. DIEHL 19-NOV-63
APPROVAL S.C. Smith 1-7-64
APPROVAL
NASA APPROVAL
MIT APPROVAL [illegible] Jan 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SILICONE POTTING COMPOUND,
CATALYST
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010701
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

— 1010702

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
A	INITIAL RELEASE CLASS A PER TDRR 04952	12/3/63	

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
   - C. EACH UNIT AND SHIPPING CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS, DATE OF MANUFACTURE.
2. ACCEPTANCE AND INSPECTION REQUIREMENTS:
   - A. MATERIAL: THE MATERIAL SHALL BE A SATURATED SOLUTION OF ACTIVE SODIUM IN A POLAR SOLVENT AND SHALL BE CAPABLE OF ETCHING TEFLON.
   - B. PROPERTIES:
     - (1) THE COLOR OF THE MATERIAL SHALL BE A GREENISH BLACK.
     - (2) THE ACTIVE SODIUM CONTENT OF THE MATERIAL SHALL BE NOT LESS THAN 0.3 GRAM EQUIVALENT PER LITER AS DETERMINED BY A BUTYL ALCOHOL TITRATION.
     - (3) SPECIFIC GRAVITY OF THE MATERIAL SHALL BE 0.97 ± 0.02 WHEN TESTED IN ACCORDANCE WITH ASTM-D-1480.
3. DESIGN REQUIREMENTS:
   - A. INTENDED USE: THE MATERIAL IS TO BE USED FOR ETCHING TEFLON SURFACES PRIOR TO ADHESIVE BONDING OR POTTING.

PROCURE ONLY FROM APPROVED SOURCE LISTED
IN ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO Contract NAS 9-497

DRAWN DATE 3 OCT 63
CHECKED 7 Oct 63
APPROVAL 12-3-63
APPROVAL

NASA APPROVAL 12-3-63

MIT APPROVAL 12/3/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TEFLON ETCHING SOLUTION

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010702

SCALE NONE WT SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010702 B

Ⓜ

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	INITIAL RELEASE CLASS A PER TDRR 04952	12/3/63	
B	REVISED PER TDRR 06772	3/10/64	RPK wk

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
   - C. EACH UNIT AND SHIPPING CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS, DATE OF MANUFACTURE AND EXPIRATION DATE FOR THE MATERIAL WHEN STORED IN UNOPENED CONTAINERS PER ND1002019 AND MIL-STD-129.
2. ACCEPTANCE AND INSPECTION REQUIREMENTS:
   - A. MATERIAL: THE MATERIAL SHALL BE A SATURATED SOLUTION OF AN ACTIVE SODIUM ARYL COMPOUND IN A POLAR SOLVENT AND SHALL BE CAPABLE OF ETCHING TEFLON.
   - B. PROPERTIES:
     - (1) THE COLOR OF THE MATERIAL SHALL BE A GREENISH BLACK.
     - (2) THE ACTIVE SODIUM CONTENT OF THE MATERIAL SHALL BE NOT LESS THAN 0.3 GRAM EQUIVALENT PER LITER AS DETERMINED BY A BUTYL ALCOHOL TITRATION.
     - (3) SPECIFIC GRAVITY OF THE MATERIAL SHALL BE 0.97 ± 0.02 WHEN TESTED IN ACCORDANCE WITH ASTM-D-1480.
3. DESIGN REQUIREMENTS:
   - A. INTENDED USE: THE MATERIAL IS TO BE USED FOR ETCHING TEFLON SURFACES PRIOR TO ADHESIVE BONDING OR POTTING.
   - B. SHELF LIFE: THE MATERIAL SHALL HAVE NOT LESS THAN 4 MONTHS USEABLE SHELF LIFE WHEN RECEIVED BY THE PURCHASER AND STORED AT 75°F ± 5°F IN UNOPENED CONTAINERS.

PROCURE ONLY FROM APPROVED SOURCE LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ± DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS DWG. NO. Contract NAS 9-497	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
APPLICATION		MATERIAL SEE REQUIREMENTS	DRAWN R W Dunn DATE 3 OCT 63 CHECKED M Olye 7 Oct 63 APPROVAL F J Simas 12-3-63 APPROVAL	TEFLON ETCHING SOLUTION SPECIFICATION CONTROL DRAWING
		HEAT TREATMENT NONE FINAL FINISH NONE	NASA APPROVAL W. J. Rhine 12-3-63 MIT APPROVAL D Hoag 12/3/63	CODE IDENT NO. SIZE C NASA DRAWING NO. 1010702 SCALE NONE WT SHEET 1 OF 1

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

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—	1010704

REVISIONS 05233			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05233		WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL:
       - a. STUD - BERYLLIUM COPPER ALLOY 25 PER QQ-C-530 1/4 HARD. HEAT TREAT TO ROCKWELL C-38 MIN.
       - b. INSULATOR - TEFLON VIRGIN GRADE, WHITE (NATURAL) COLOR.
     - (2) FINISH:
       - a. STUD - HARD GOLD PLATE .000050 PER MIL-G-45204, TYPE II, CLASS 1, OVER .0001 COPPER STRIKE.
     - (3) DIMENSIONS: PER FIGURES.
     - (4) MARKING:
       - a. PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION: SUPPLIER'S NAME, NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER, SUPPLIER'S LOT OR SERIAL NUMBER, DATE CODE, OR DATE OF MANUFACTURE.
       - b. MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.
3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL:
     - (1) VOLTAGE RATING: 1500 VOLTS (RMS) 60 CYCLES AT SEA LEVEL.
     - (2) CURRENT RATING: 2 AMPS.
     - (3) CAPACITANCE: 0.7 PICOFARADS MAX IN 0.050 PLATE.
   - B. ENVIRONMENTAL:
     - (1) TEMPERATURE RANGE: 65°C (-85°F) TO 200°C (392°F).

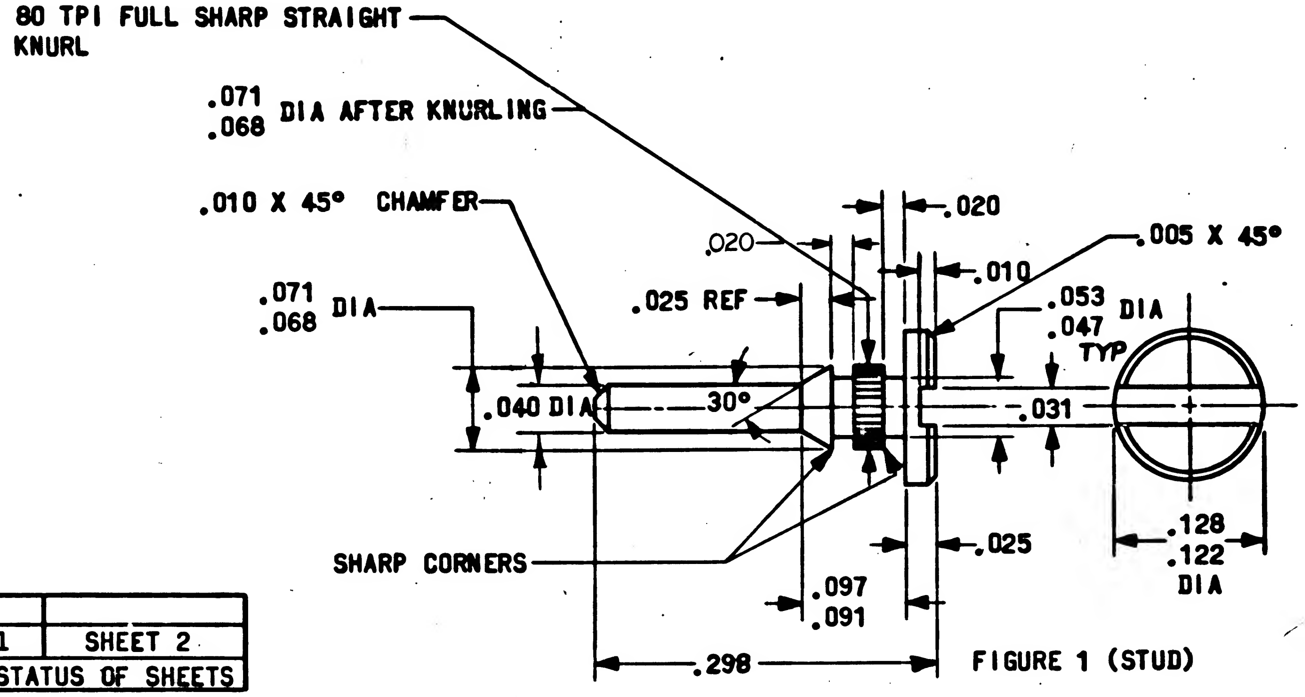


FIGURE 1 (STUD)

SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
NONE

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497

DRAWN Bender DATE 20-NOV-63
CHECKED Ed Foster 22 Nov 63
APPROVAL S. C. Smith 12-16-63
APPROVAL

NASA APPROVAL 12/17/63

MIT APPROVAL 17 Dec 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL, FEED THROUGH,
INSULATED (TWO PIECE)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	C	1010704
SCALE NONE	WT	SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

— 1010704

REVISIONS 05233			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05233		WK

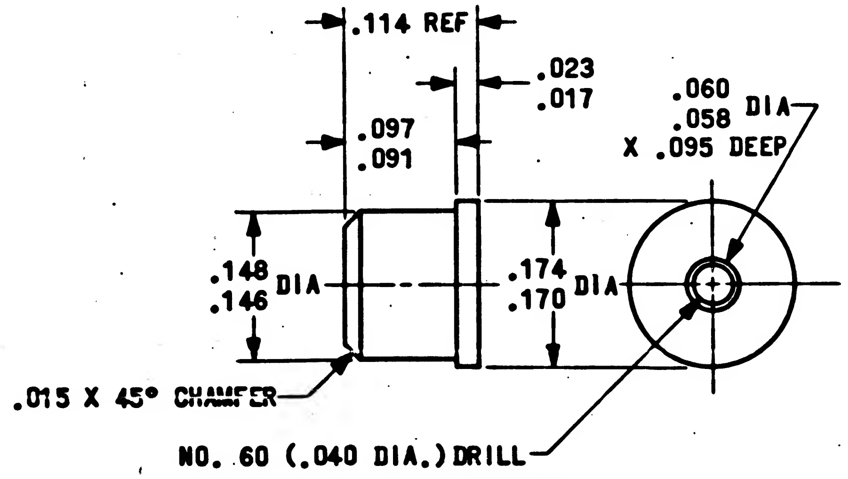


FIGURE 2 (INSULATOR)

NASA DASH NUMBER	FIGURE	DESCRIPTION
- 1	1	TERMINAL, STUD
- 2	2	BUSHING, INSULATOR

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.005	± 5°

DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MASTER

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
Contract NAS 9-497

DRAWN Bender DATE 22-NOV-63
CHECKED Ed Foster 22 Nov 63
APPROVAL S.C. Smith 12-16-63
APPROVAL
NASA APPROVAL 12/17/63
MIT APPROVAL W Kupfer 17 Dec 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL, FEED THROUGH,
INSULATED (TWO PIECE)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	C	1010704

SCALE NONE WT SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

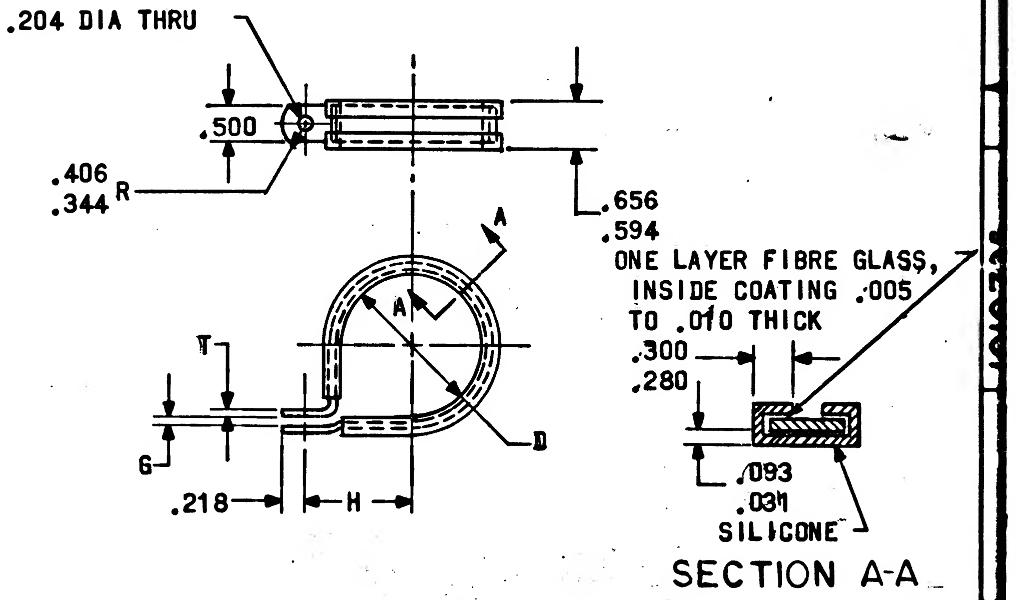
—	1010705

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04954	12/3/63	

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. PARTS SHALL CONFORM TO REQUIREMENTS OF MIL-C-8603 WITH THE EXCEPTION OF CLASSIFICATION PARA. 1.2.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: CLAMP: CORROSION RESISTANT STEEL PER MIL-S-6721.
       CUSHION: SILICONE RUBBER (RED) PER AMS 3303.
     - (2) MARKING: PIECEMARKING: PART SHALL BE PERMANENTLY AND LEGIBLY MARKED PER MIL-STD-130 WITH THE NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.
       PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
       SUPPLIER'S NAME
       NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER
       DATE CODE, OR DATE OF MANUFACTURE.
       MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

NASA PART NUMBER	D ±.015	H ±.015	G +.016 -.000	T
1010705- 3	.188	.498	.062	.032
- 4	.250	.529		
- 5	.313	.560		
- 6	.375	.592		
- 7	.438	.623		
- 8	.500	.654		
- 9	.564	.686		
- 10	.625	.716		
- 11	.688	.749		
- 12	.750	.780		
- 13	.812	.811		
- 14	.875	.842		
- 15	.938	.858		
- 16	1.000	.889	↓	↓



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT NAS9-497
DRAWN R W Turner DATE 1 OCT 63
CHECKED Ed Foster 1 NOV 63
APPROVAL 12/3/63
APPROVAL
NASA APPROVAL W. J. Rhine 12-3-63
MIT APPROVAL 12/3/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CLAMP

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010705
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010707 -

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 06413	1/18/64	WKL

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
   - C. EACH UNIT, SPOOL AND SHIPPING CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS, LOT NUMBER AND DATE OF MANUFACTURE.

2. INSPECTION AND ACCEPTANCE:
   - A. CONSTRUCTION:
     - (1) CONDUCTOR - SEE TABLE I
       - (a) OUTSIDE DIAMETER - SEE TABLE I EACH STRAND.
     - (2) NUMBER OF CONDUCTORS - 3 (TWISTED .5 TO 1 TURNS PER INCH)
     - (3) INSULATION - TEFLON EXTRUDED .033 MIN, .037 MAX; COLOR, 1 COND. BLUE, 1 COND. RED, 1 COND. NATURAL (WHITE)
     - (4) SHIELD - COPPER, SILVER PLATED (4 PERCENT OF TOTAL WEIGHT OF WIRE). - SIZE AWG 38 .0039 MIN, .0043 MAX INCH
       - (a) OUTSIDE DIAMETER - .097 MAX
       - (b) CARRIERS - 16
       - (c) WIRES PER CARRIER - 5
       - (d) PICKS PER INCH - 14 MIN, 18 MAX
     - (5) JACKET - NYLON EXTRUDED COLOR RED.
       - (a) WALL THICKNESS - .005 MIN, .015 MAX
       - (b) OUTSIDE DIAMETER - .117 MAX
   - B. ELECTRICAL CHARACTERISTICS:
     - (1) CONDUCTOR RESISTANCE OHMS/FT. - .25 MAX
     - (2) SHIELD RESISTANCE OHMS/FT. - .020 MAX
     - (3) VOLTAGE RATING - 1000 VOLTS RMS
     - (4) CAPACITANCE - BETWEEN ANY TWO INNER CONDUCTORS 9.5 TO 13.5 PICOFARADS PER FOOT AT 1KC. ANY CONDUCTOR TO SHIELD 21.5 TO 25.5 AT 1KC.
     - (5) LEAKAGE RESISTANCE - OHMS/FT 10^{14} MIN AT 500 VOLTS.
     - (6) POWER FACTOR - .001 MAX
     - (7) DIELECTRIC CONSTANT - 2.1 MAX
     - (8) TEMPERATURE RATING - 105°C.

3. DESIGN REQUIREMENTS:
   - A. SHELF LIFE - NOT REQUIRED

PART NO 1010707	CONDUCTOR CONSTRUCTION		
	CONDUCTOR SIZE	MATERIAL	COND. DIA
DASH 1	7/#38 AWG (STRANDED)	40% COPPERWELD SILVER PLATED 4% MIN (BY WEIGHT)	.0129 .0117
DASH 2	#29 AWG (SOLID)	40% COPPER COVERED STEEL, SILVER PLATED 40 MICRO IN. MIN	.0114 .0112

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
Contract NAS 9-497

DRAWN DOBBERT DATE 31-OCT-63
CHECKED 9 JAN 64
APPROVAL 2/17/64
APPROVAL
NASA APPROVAL
MIT APPROVAL WKL 18 Feb 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

THREE CONDUCTOR TEFLON INSULATED
SHIELDED NYLON JACKETED CABLE

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010707
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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B	1010708

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05565	31 Dec 63	WK
A	REVISED PER TDRR 06779	3/10/64	WK
B	REVISED PER TDRR 07021	3/18/64	WK

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING SHALL BE IN ACCORDANCE WITH SPECIFICATION N 1015404, CLASS 3.

C. EACH UNIT AND SHIPPING CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED PER MIL-STD-129 WITH THE MANUFACTURER'S NAME AND SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS AND DATE OF MANUFACTURE.

2. ACCEPTANCE AND INSPECTION:

A. CONDUCTOR, SOLID:

(1) #24 AWG WIRE: COPPER PER QQ-W-343, SOFT OR ANNEALED, SILVER PLATED 40 MICRO-INCHES MINIMUM PER ASTM-B-298-58T.

(2) #30 AWG WIRE: COPPER (98 PERCENT MINIMUM), NON-MAGNETIC SILVER PLATED 40 MICRO-INCHES MINIMUM PER ASTM-B-298-58T.

B. TENSILE STRENGTH: PER TABLE, WHEN PULLED AT A RATE OF 10 INCHES PER MINUTE PER FEDERAL STANDARD 151, METHOD 211.

C. ELONGATION: 8 PERCENT MINIMUM, WHEN TESTED PER FED. STD. 151 METHOD 211.

D. CAPACITANCE (FOR 1010708-1): TEST PER MIL-C-17

(1) CONDUCTOR TO CONDUCTOR: 10 PICO FARADS PER FOOT, MAXIMUM

(2) CONDUCTOR TO SHIELD: 20 PICO FARADS PER FOOT, MAXIMUM

E. DIELECTRIC CONSTANT: 2.5 MAX AT 60 CPS AND 77°F WHEN TESTED PER FED-STD-406 METHOD 4021.

F. RESISTANCE, DC: PER TABLE, WHEN TESTED PER METHOD 303 OF MIL-STD-202.

G. CONCENTRICITY, CONDUCTOR: THE MINIMUM THICKNESS OF THE INSULATION SHALL NOT BE LESS THAN 41 PERCENT OF THE DIFFERENCE BETWEEN THE MEASURED DIAMETER OVER THE INSULATION AND THE MEASURED DIAMETER OVER THE CONDUCTOR OR NOT LESS THAN 80 PERCENT OF THE MAXIMUM THICKNESS AT THAT CROSS SECTION.

H. INSULATION PULL OFF FORCE: 8 OUNCES MINIMUM.

(1) A SIX (6) INCH LENGTH OF WIRE SHALL BE STRIPPED 1-1/2 INCHES ON EACH END. ONE END OF THE WIRE SHALL BE PASSED THROUGH A HOLE IN A METAL PLATE WHOSE DIAMETER IS 0.012 FOR 30 AWG AND 0.022 FOR 24 AWG. THE END OF THE WIRE WHICH PASSES THROUGH THE PLATE SHALL THEN BE PULLED IN SUCH MANNER AS TO MEASURE THE FORCE REQUIRED TO PULL THE WIRE THROUGH THE INSULATION.

J. DIELECTRIC STRENGTH: PER TABLE, WHEN TESTED PER MIL-W-16878/4, IMMERSED IN WATER.

K. INSULATION RESISTANCE: 5000 MEGOHMS MINIMUM, WHEN TESTED PER MIL-W-16878/4, IMMERSED IN WATER.

L. SHIELD: 85% MINIMUM-COVERAGE PER MIL-W-16878.

(1) MATERIAL: SHALL BE 38 AWG COPPER WIRE TIN PLATED.

B	B	A
A	A	A
—	—	—
SHEET 1	SHEET 2	SHEET 3
REVISION STATUS OF SHEETS		

PROCURE ONLY FROM APPROVED SOURCE LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Sullivan DATE 25 Nov 63
CHECKED A. Matz 12-30-63
APPROVAL A. Test 12-31-63
APPROVAL
NASA APPROVAL W. E. Swing 12/31/63
MIT APPROVAL W Kupfer 31 Dec 63

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HOUSTON, TEXAS

WIRE MODIFIED MONOCHLOROTRIFLUOROETHYLENE
INSULATION SOLID COPPER ALLOY
SILVER PLATE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	C	1010708

SCALE NONE WT SHEET 1 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMEN THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05565	3/20/63	WK
A	REVISED PER TDRR 06779	3/10/64	WK
B	REVISED PER TDRR 07021	3/17/64	WK

3. DESIGN

A. MATERIAL: EXTRUDED MODIFIED MONOCHLOROTRIFLUOROETHYLENE OR TEFLON.

B. VOLTAGE RATING: 250 VOLTS RMS

C. TEMPERATURE: 140°C

D. FLAMABILITY: 30 SECONDS MAXIMUM BURNING TIME FOR 3 INCHES MAXIMUM FLAME TRAVEL WHEN TESTED PER MIL-W-16878.

E. INSULATION CUT THROUGH: SPECIMENS OF THE WIRE SHALL RESIST THE PENETRATION OF THE UNDERWRITERS LABORATORY STANDARD PENETRATION APPARATUS USING A METAL BLADE WITH A 90° ANGLE AND .005-INCH (±.0002) RADIUS EDGE AT THE POINT OF CONTACT. THE BLADE SHALL BE LOADED WITH 400 GRAMS AND SHALL BE APPLIED TO THE INSULATED WIRE FOR A PERIOD OF 24 HOURS WHILE MAINTAINED AT 50°C. DURING THIS PERIOD, A POTENTIAL OF 500 VOLTS RMS SHALL BE APPLIED BETWEEN THE BLADE AND THE METAL CONDUCTOR OF THE SPECIMEN AND NO ELECTRICAL CONTINUITY SHALL OCCUR.

F. STRAIGHTNESS: THE WIRE SHALL UNCOIL FREELY WITHOUT EXHIBITING A SET. A 30 INCH PIECE OF WIRE CUT FROM A SPOOL OR BARREL SHALL NOT RECOIL ITSELF INTO A 10 INCH DIAMETER CIRCLE.

G. WORKMANSHIP: THE SURFACE OF THE FINISHED WIRE SHALL BE CLEAN, SMOOTH, FREE FROM FOREIGN RESIDUE, AND FREE FROM VISIBLE BLEMISHES. THERE SHALL BE NO IMPERFECTIONS WHICH INCREASE THE OVERALL DIAMETER SO AS TO EXCEED THE MAXIMUM SPECIFIED. THE INSULATION SHALL BE UNIFORM THROUGHOUT AND FREE FROM ANY DEFECTS SUCH AS INCLUSIONS, RADIAL CRACKS, PINHOLES, DISCOLORATION OF CONDUCTOR OR INSULATION WHICH MAY AFFECT ITS SERVICEABILITY OR REQUIRE SPECIAL HANDLING.

H. SPLICES: THE WIRE SHALL BE STRIPPED 2 INCHES ON EITHER SIDE OF ANY SPLICE.

J. TWIST LAY: 8 TO 14 TIMES THE TWISTED OUTSIDE DIAMETER.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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DWG. NO. CONTRACT
DRAWN J.R. Sullivan DATE 25 Nov 63
CHECKED A. Matz 12-30-63
APPROVAL D. B. 12-31-63
APPROVAL
NASA APPROVAL 12/31/63
MIT APPROVAL 31 Dec

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HOUSTON, TEXAS

WIRE MODIFIED MONOCHLOROTRIFLUOROETHYLENE
INSULATION SOLID COPPER ALLOY
SILVER PLATE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. — | SIZE C | NASA DRAWING NO. 1010708
SCALE NONE | WT | SHEET 2 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010708

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05565	31 Dec 63	WK

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING SHALL BE IN ACCORDANCE WITH SPECIFICATION N 1015404, CLASS 3.

C. EACH UNIT AND SHIPPING CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS AND DATE OF MANUFACTURE.

2. ACCEPTANCE AND INSPECTION:

A. CONDUCTOR, SOLID:

(1) #24 AWG WIRE: COPPER PER QQ-W-343, SOFT OR ANNEALED, SILVER PLATED 40 MICRO-INCHES MINIMUM PER ASTM-B-298-58T.

(2) #30 AWG WIRE: COPPER (98 PERCENT MINIMUM), NON-MAGNETIC SILVER PLATED 40 MICRO-INCHES MINIMUM PER ASTM-B-298-58T.

B. TENSILE STRENGTH: PER TABLE, WHEN PULLED AT A RATE OF 10 INCHES PER MINUTE PER FEDERAL STANDARD 151, METHOD 211.

C. ELONGATION: 8 PERCENT MINIMUM, WHEN TESTED PER FED. STD. 151 METHOD 211.

D. CAPACITANCE (FOR 1010708-1): TEST PER MIL-C-17

(1) CONDUCTOR TO CONDUCTOR: 10 PICO FARADS PER FOOT, MAXIMUM

(2) CONDUCTOR TO SHIELD: 20 PICO FARADS PER FOOT, MAXIMUM

E. DIELECTRIC CONSTANT: 2.5 MAX AT 60 CPS AND 77°F WHEN TESTED PER L-P-406 METHOD 4021.

F. RESISTANCE, DC: PER TABLE, WHEN TESTED PER METHOD 303 OF MIL-STD-202.

G. CONCENTRICITY, CONDUCTOR: THE MINIMUM THICKNESS OF THE INSULATION SHALL NOT BE LESS THAN 41 PERCENT OF THE DIFFERENCE BETWEEN THE MEASURED DIAMETER OVER THE INSULATION AND THE MEASURED DIAMETER OVER THE CONDUCTOR OR NOT LESS THAN 80 PERCENT OF THE MAXIMUM THICKNESS AT THAT CROSS SECTION.

H. INSULATION PULL OFF FORCE: 8 OUNCES MINIMUM.

(1) A SIX (6) INCH LENGTH OF WIRE SHALL BE STRIPPED 1-1/2 INCHES ON EACH END. ONE END OF THE WIRE SHALL BE PASSED THROUGH A HOLE IN A METAL PLATE WHOSE DIAMETER IS 0.012 FOR 30 AWG AND 0.022 FOR 24 AWG. THE END OF THE WIRE WHICH PASSES THROUGH THE PLATE SHALL THEN BE PULLED IN SUCH MANNER AS TO MEASURE THE FORCE REQUIRED TO PULL THE WIRE THROUGH THE INSULATION.

J. DIELECTRIC STRENGTH: PER TABLE, WHEN TESTED PER MIL-W-16878/4, IMMERSED IN WATER.

K. INSULATION RESISTANCE: 5000 MEGOHMS MINIMUM, WHEN TESTED PER MIL-W-16878/4, IMMERSED IN WATER.

L. SHIELD: 85% MINIMUM-COVERAGE PER MIL-W-16878.

(1) MATERIAL: SHALL BE 38 AWG COPPER WIRE TIN PLATED.

—	—	—
SHEET 1	SHEET 2	SHEET 3
REVISION STATUS OF SHEETS		

PROCURE ONLY FROM APPROVED SOURCE LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN JR Sullivan DATE 25 Nov 63
CHECKED A. Marts 12-30-63
APPROVAL 12-31-63
APPROVAL
NASA APPROVAL 12/31/63
MIT APPROVAL W Kupfer 31 Dec 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRE MODIFIED MONOCHLOROTRIFLUOROETHYLENE
INSULATION SOLID COPPER ALLOY
SILVER PLATE

CODE IDENT NO. — SIZE C NASA DRAWING NO. 1010708

SCALE NONE WT SHEET 1 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05565	31 Dec 63	WK

3. DESIGN

A. MATERIAL: EXTRUDED MODIFIED MONOCHLOROTRIFLUOROETHYLENE OR TEFLON.

B. VOLTAGE RATING: 250 VOLTS RMS

C. TEMPERATURE: 140°C

D. FLAMABILITY: 30 SECONDS MAXIMUM BURNING TIME FOR 3 INCHES MAXIMUM FLAME TRAVEL WHEN TESTED PER MIL-W-16878.

E. INSULATION CUT THROUGH: SPECIMENS OF THE WIRE SHALL RESIST THE PENETRATION OF A METAL BLADE WITH A THICKNESS OF 0.003 INCH ±0.002 INCH WITH 750 GRAMS APPLIED AT THE POINT OF CONTACT FOR 24 HOURS. THE TEST SHALL BE PERFORMED IN AN OVEN AT 50°C. THERE SHALL BE NO ELECTRICAL CONTINUITY BETWEEN THE BLADE AND THE CONDUCTOR WHEN A POTENTIAL OF 500 VOLTS RMS IS APPLIED.

F. STRAIGHTNESS: THE WIRE SHALL UNCOIL FREELY WITHOUT EXHIBITING A SET. A 30 INCH PIECE OF WIRE CUT FROM A SPOOL OR BARREL SHALL NOT RECOIL ITSELF INTO A 10 INCH DIAMETER CIRCLE.

G. WORKMANSHIP: THE SURFACE OF THE FINISHED WIRE SHALL BE CLEAN, SMOOTH, FREE FROM FOREIGN RESIDUE, AND FREE FROM VISIBLE BLEMISHES. THERE SHALL BE NO IMPERFECTIONS WHICH INCREASE THE OVERALL DIAMETER SO AS TO EXCEED THE MAXIMUM SPECIFIED. THE INSULATION SHALL BE UNIFORM THROUGHOUT AND FREE FROM ANY DEFECTS SUCH AS INCLUSIONS, RADIAL CRACKS, PINHOLES, DISCOLORATION OF CONDUCTOR OR INSULATION WHICH MAY AFFECT ITS SERVICEABILITY OR REQUIRE SPECIAL HANDLING.

H. SPLICES: THE WIRE SHALL BE STRIPPED 2 INCHES ON EITHER SIDE OF ANY SPLICE.

J. TWIST LAY: 8 TO 14 TIMES THE TWISTED OUTSIDE DIAMETER.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN J.R. Sullivan DATE 25 Nov 63
CHECKED A. Matts 12-30-63
APPROVAL D. A. [illegible] 12-31-63
APPROVAL
NASA APPROVAL W. S. [illegible] 12/31/63
MIT APPROVAL [illegible] 31 Dec 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRE MODIFIED MONOCHLOROTRIFLUOROETHYLENE
INSULATION SOLID COPPER ALLOY
SILVER PLATE

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	C	1010708

SCALE NONE WT SHEET 2 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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1010708

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05565	31Dec63	WK.

NASA DASH NUMBER	AWG SIZE PER COND.	UNINSULATED CONDUCTOR DIAMETER INCHES	WALL THICKNESS PER COND. NOMINAL	DIAMETER OVER CONDUCTOR INSULATION	NUMBER OF CONDUCTOR	CONDUCTOR COLOR INSULATION	DIAMETER OVER SHIELD	DIAMETER JACKET OVER SHIELD / WALL THICKNESS	COLOR	DC RES MAX PER COND Ω/M FT.	TENSILE STRENGTH LBS./IN²	DIELETRIC STRENGTH VRMS
-1	30	.010 +.0003 -.0001	.022	.054±.003	3	BLUE WHITE RED	.133	.153±.008 / .010±.002	WHITE	118	50,000	2200
-2	30	.010 +.0003 -.0001	.0055	.021 ± .0015	2	RED BLUE	.059	.079±.005 / .010±.002	WHITE	118	50,000	1000
-3	24	.0201 +.0006 -.0002	.011	.042 ± .002	2	RED BLUE	.101	.121±.008 / .010±.002	WHITE	26	30,000	2200
-4	30	.010 +.0003 -.0001	.0055	.021 ± .0015	1	BLUE	—	—	—	118	30,000	1000
-5	24	.0201 +.0006 -.0002	.011	.042 ± .002	1	BLUE	—	—	—	26	30,000	2200

1010708

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL ____
HEAT TREATMENT ____
FINAL FINISH ____

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN J.R. Sullivan DATE 25 Nov 63
CHECKED P. Rendo 26 NOV 63
APPROVAL D. A. Tett 12-31-63
APPROVAL ____
NASA APPROVAL 12/31/63
MIT APPROVAL W Kupfer 31Dec63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRE MODIFIED MONOCHLOROTRIFLUOROETHYLENE
INSULATION SOLID COPPER ALLOY
SILVER PLATE

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010708
SCALE NONE
WT
SHEET 3 OF 3

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

A 1010709

REVISIONS			08767
SYM	DESCRIPTION	DATE	APPROVAL
Ⓜ —	INITIAL RELEASE CLASS A PER TDRR 08767	5/26/64	WH.
A	REVISED PER TDRR 11982	6/1/64	WR

REQUIREMENTS:

1. **GENERAL:**

A. DESIGN TO BE IN CONFORMANCE WITH SPECIFICATION MIL-T-27 AND ND 1015401 (FOR LEADS) AS PROVIDED BELOW.

B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN SPECIFICATION ND 1015404, CLASS 2.

C. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

2. **INSPECTION AND ACCEPTANCE:**

A. UNIT SHALL MEET ALL REQUIREMENTS OF TABLE I.

B. MARKING: MARK UNIT PERMANENTLY AND LEGIBLY PER ND1002019 WITH THE NASA DRAWING NUMBER AND REVISION LETTER, MANUFACTURER'S SERIAL NUMBER AND CONNECTION DATA. THE MANUFACTURER'S PART OR TYPE NUMBER MAY APPEAR ON THE PART AND PACKAGE. PER MIL-STD-129

C. LEADS: LEAD MATERIAL SHALL BE DUMET ALLOY PER ND-1015401 EXCEPT NICKEL STRIKE MAY BE 50-100 MICROINCHES AND LEAD DIAMETER SHALL BE 0.016 ± .001 DIA A CERTIFICATION OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.

D. FINISH: BLACK, SHADE NO. 37038 PER FED-STD-595.

E. DIMENSIONS: AS SHOWN.

3. **DESIGN REQUIREMENTS:**

A. THE UNIT SHALL MEET ALL REQUIREMENTS OF MIL-T-27 FOR GRADE 4, CLASS R LIFE EXPECTANCY X, FAMILY 13, IN AN AMBIENT TEMPERATURE OF 85°C.

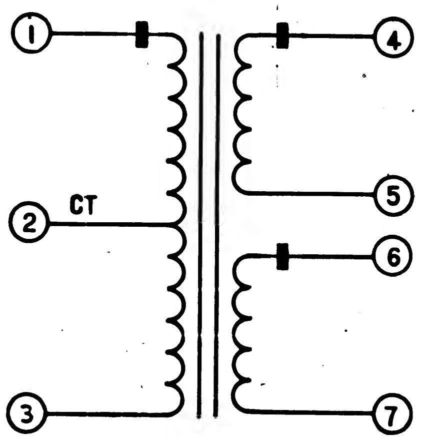
B. THE UNIT SHALL MEET ALL ELECTRICAL REQUIREMENTS EXCEPT WHERE NOTED, BEFORE, DURING, AND AFTER THE FOLLOWING EXPOSURES:

(1) HIGH TEMPERATURE: 71°C OPERATING
(2) LOW TEMPERATURE: -18°C OPERATING
(3) VIBRATION: 10 TO 2000 CPS, 20 G (PER MIL-STD-202, METHOD 204 A, CONDITION D)
(4) REDUCED PRESSURE: 96 HOURS AT A PRESSURE OF 10^{-4} MM OF MERCURY.

C. DC UNBALANCE IN PRIMARY: 3 MA MAXIMUM

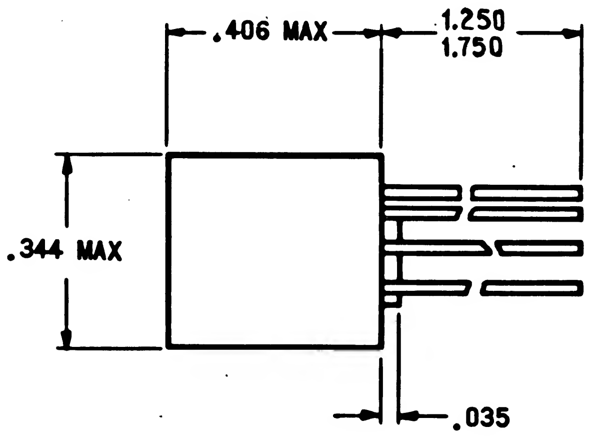
D. RATED POWER LEVEL: 100 MW

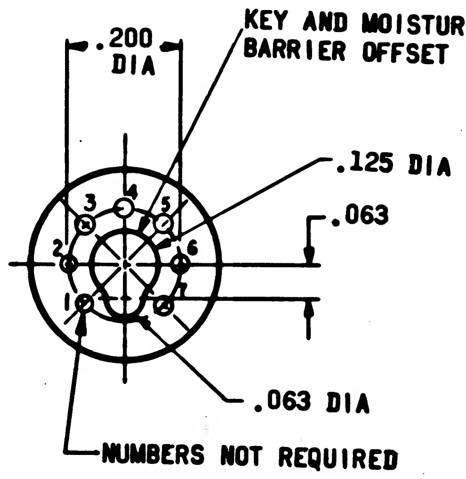
E. WORKING VOLTAGE BETWEEN WINDINGS AND FROM WINDINGS TO CASE: 49 VOLTS MAXIMUM INSTANTANEOUS.



SCHEMATIC DIAGRAM

VOLTAGES AND CURRENTS ARE RMS VALUES UNLESS OTHERWISE NOTED.





PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS ±.005
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN Bender DATE 14-NOV-63
CHECKED C. Wilson 15 Nov 63
APPROVAL G. MAYO 5/25/64
APPROVAL
NASA APPROVAL 5/26/64
MIT APPROVAL 24 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER, AUDIO FREQUENCY
(1:2 TURNS RATIO)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010709
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 08767			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 08767	5/26/64	WK
A	REVISED PER TDRR 11982	9/1/64	WK

REQUIREMENTS: (CONTINUED)

4. SPECIAL CONDITIONING (BY MANUFACTURER):
   A. TRANSFORMER SHALL BE TEMPERATURE CYCLED FOR 5 CYCLES PER MIL-STD-202B METHOD 102A EXCEPT THAT THE TEMPERATURES SHALL BE -55°C, +25°C AND +105°C AND EXPOSURE TIME SHALL BE 15 MINUTES AT EACH TEMPERATURE. DURING THE LAST CYCLE THE UNIT SHALL BE TESTED FOR CONTINUITY AT EACH OF THE AMBIENT CONDITIONS. AFTER STABILIZATION AT ROOM TEMPERATURE UNIT SHALL PASS NORMAL PRODUCTION TESTS.

TABLE I

INSPECTION TESTS	
TITLES IN PARAGRAPH COLUMN REFER TO PARAGRAPH TITLES IN SPECIFICATION MIL-T-27	
	METHODS AND REQUIREMENTS PER MIL-T-27
SEALING	IMMERSE IN LIQUID AS INDICATED
DIELECTRIC STRENGTH	APPLY 100 VOLTS (RMS) BETWEEN WINDINGS AND BETWEEN WINDINGS AND CASE.
INSULATION RESISTANCE	10000 MEGOHMS MINIMUM AT 25°C. (USE 100 V DC MAX)
DC RESISTANCE (AT 25°C)	R(1-3) = 225 OHMS MAXIMUM; R(4-7) = 550 OHMS MAXIMUM. (SECONDARY WINDINGS IN SERIES).
INDUCTANCE	SHALL BE 0.21 HENRYS MINIMUM WITH 5 VOLTS, 1000 CPS, 0 DC (1-3)
DISTORTION (AT 1 KC)	5% MAXIMUM WITH A 8000 OHM LOAD AT 100 MW OUTPUT.
FREQUENCY RESPONSE	(REFERENCE FREQUENCY 1 KC): ± 3 DB FROM 400 CPS TO 100 KC. E_S SHALL BE DETERMINED AT 1 KC WITH AN OUTPUT LOAD (4-7) (JOIN 5 TO 6) OF 8000 OHMS AT 1 MW, A SOURCE IMPEDANCE OF 2000 OHMS AND 0 DC. E_S SHALL BE HELD CONSTANT OVER THE FREQUENCY RANGE.
POLARITY	1, 4 AND 6 SHALL BE LIKE POLARITY.
NO LOAD VOLTAGE RATIO	WITH 5 VOLTS, 5 KC (1-3), V(1-3)/V(4-7) (JOIN 5 TO 6) = 1:2 ± 5%. ALSO V(1-2)/V(2-3) = 1:1 ± 2%; V(4-5)/V(6-7) = 1:1 ± 2%.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO Contract NAS 9-497
DRAWN Bender DATE 14-NOV-63
CHECKED C. Wilson 15 NOV 63
APPROVAL G. MAYO 5/26/64
APPROVAL
NASA APPROVAL 5/26/64
MIT APPROVAL 26 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER, AUDIO FREQUENCY
(1:2 TURNS RATIO)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1010709
SCALE | WT | SHEET 2 OF 2

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

—	1010709

REVISIONS 08767

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 08767	9/4/64	wH.

REQUIREMENTS:

1. **GENERAL:**

A. DESIGN TO BE IN CONFORMANCE WITH SPECIFICATION MIL-T-27 AND ND 1015401 (FOR LEADS) AS PROVIDED BELOW.

B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN SPECIFICATION ND 1015404, CLASS 2.

C. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

2. **INSPECTION AND ACCEPTANCE:**

A. UNIT SHALL MEET ALL REQUIREMENTS OF TABLE I.

B. MARKING: MARK UNIT PERMANENTLY AND LEGIBLY PER ND1002019 WITH THE NASA DRAWING NUMBER AND REVISION LETTER, MANUFACTURER'S SERIAL NUMBER AND CONNECTION DATA. THE MANUFACTURER'S PART OR TYPE NUMBER MAY APPEAR ON THE PART AND PACKAGE.

C. LEADS: THE ULTIMATE LEAD MATERIAL IS DUMET ALLOY 0.016 ± 0.001 DIA. UNTIL THIS MATERIAL IS AVAILABLE IN PRODUCTION (AT WHICH TIME THIS DRAWING WILL BE UPDATED BY CHANGE) THE LEAD MATERIAL SHALL BE DUMET ALLOY 0.017 ± 0.002 DIA., GOLD PLATED. IN ALL OTHER RESPECTS, LEADS SHALL CONFORM TO ND 1015401. A CERTIFICATION OF COMPLIANCE WITH THIS LEAD MATERIAL REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.

D. FINISH: BLACK, SHADE NO. 37038 PER FED-STD-595.

E. DIMENSIONS: AS SHOWN.

3. **DESIGN REQUIREMENTS:**

A. THE UNIT SHALL MEET ALL REQUIREMENTS OF MIL-T-27 FOR GRADE 4, CLASS R LIFE EXPECTANCY X, FAMILY 13, IN AN AMBIENT TEMPERATURE OF 85°C.

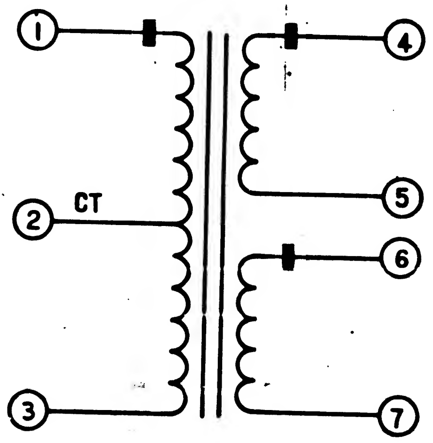
B. THE UNIT SHALL MEET ALL ELECTRICAL REQUIREMENTS EXCEPT WHERE NOTED, BEFORE, DURING, AND AFTER THE FOLLOWING EXPOSURES:

(1) HIGH TEMPERATURE: 71°C OPERATING
(2) LOW TEMPERATURE: -18°C OPERATING
(3) VIBRATION: 10 TO 2000 CPS, 20 G (PER MIL-STD-202, METHOD 204 A, CONDITION D)
(4) REDUCED PRESSURE: 96 HOURS AT A PRESSURE OF 10^{-4} MM OF MERCURY.

C. DC UNBALANCE IN PRIMARY: 3 MA MAXIMUM

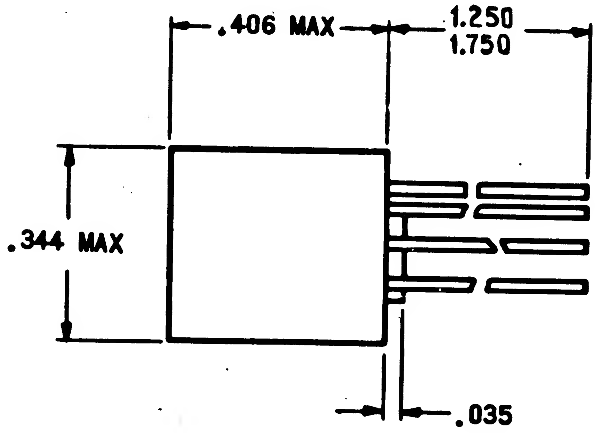
D. RATED POWER LEVEL: 100 MW

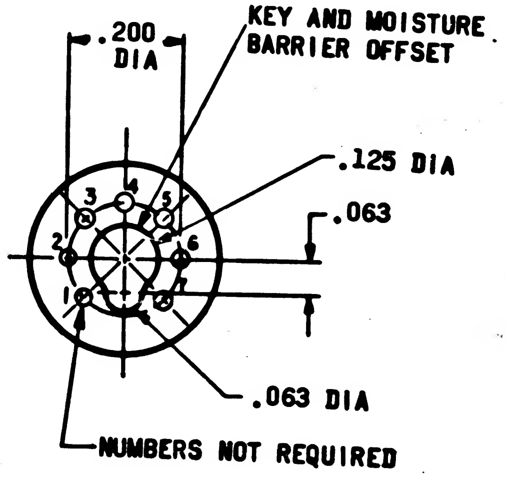
E. WORKING VOLTAGE BETWEEN WINDINGS AND FROM WINDINGS TO CASE: 49 VOLTS MAXIMUM INSTANTANEOUS.



SCHEMATIC DIAGRAM

VOLTAGES AND CURRENTS ARE RMS VALUES UNLESS OTHERWISE NOTED.





PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN Bender DATE 14-NOV-63
CHECKED C. Wilson 15 Nov 63
APPROVAL G. MAYO 5/25/64
APPROVAL
NASA APPROVAL 5/26/64
MIT APPROVAL 29 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER, AUDIO FREQUENCY
(1:2 TURNS RATIO)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010709
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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— 1010709

REVISIONS 08767

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 08767	5/26/64	WK

REQUIREMENTS: (CONTINUED)

4. SPECIAL CONDITIONING (BY MANUFACTURER):
   A. TRANSFORMER SHALL BE TEMPERATURE CYCLED FOR 5 CYCLES PER MIL-STD-202B METHOD 102A EXCEPT THAT THE TEMPERATURES SHALL BE -55°C, +25°C AND +105°C AND EXPOSURE TIME SHALL BE 15 MINUTES AT EACH TEMPERATURE. DURING THE LAST CYCLE THE UNIT SHALL BE TESTED FOR CONTINUITY AT EACH OF THE AMBIENT CONDITIONS. AFTER STABILIZATION AT ROOM TEMPERATURE UNIT SHALL PASS NORMAL PRODUCTION TESTS.

TABLE I

INSPECTION TESTS

	METHODS AND REQUIREMENTS PER MIL-T-27
	SEALING
	DIELECTRIC STRENGTH: APPLY 100 VOLTS (RMS) BETWEEN WINDINGS AND BETWEEN WINDINGS AND CASE.
	INSULATION RESISTANCE: 10000 MEGOHMS MINIMUM AT 25°C. (USE 100 V DC MAX)
	DC RESISTANCE (AT 25°C): R(1-3) = 225 OHMS MAXIMUM; R(4-7) = 550 OHMS MAXIMUM. (SECONDARY WINDINGS IN SERIES).
	INDUCTANCE: SHALL BE 0.21 HENRYS MINIMUM WITH 5 VOLTS, 1000 CPS, 0 DC (1-3)
	DISTORTION (AT 1 KC): 5% MAXIMUM WITH A 8000 OHM LOAD AT 100 MW OUTPUT.
	FREQUENCY RESPONSE: (REFERENCE FREQUENCY 1 KC): ± 3 DB FROM 400 CPS TO 100 KC. E_S SHALL BE DETERMINED AT 1 KC WITH AN OUTPUT LOAD (4-7) (JOIN 5 TO 6) OF 8000 OHMS AT 1 MW, A SOURCE IMPEDANCE OF 2000 OHMS AND 0 DC. E_S SHALL BE HELD CONSTANT OVER THE FREQUENCY RANGE.
	POLARITY: LEADS 1, 4 AND 6 SHALL BE LIKE POLARITY.
	NO LOAD VOLTAGE RATIO: WITH 5 VOLTS, 5 KC (1-3), V(1-3)/V(4-7) (JOIN 5 TO 6) = 1:2 ± 5%. ALSO V(1-2)/V(2-3) = 1:1 ± 2%; V(4-5)/V(6-7) = 1:1 ± 2%.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO Contract NAS 9-497
DRAWN Bender DATE 14-NOV-63
CHECKED C. Wilson 15 NOV 63
APPROVAL G. MAYO 5/25/64
APPROVAL
NASA APPROVAL 5/26/64
MIT APPROVAL 26 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER, AUDIO FREQUENCY
(1:2 TURNS RATIO)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010709
SCALE
WT
SHEET 2 OF 2

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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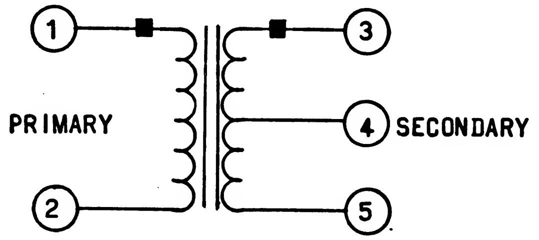
— 1010710

REVISIONS 05234			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05234		EDK WK

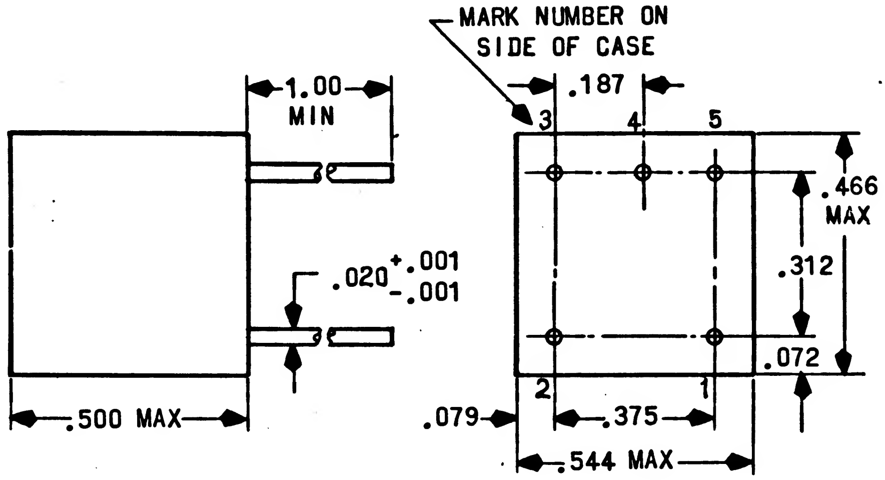
REQUIREMENTS:

1. GENERAL:
   - A. DESIGN TO BE IN CONFORMANCE WITH MIL-T-27.
   - B. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - C. SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404, CLASS 2.
   - D. PACKAGING AND PACKING: LEVEL C (MANUFACTURER'S NORMAL COMMERCIAL PRACTICE).
     - (1) UNIT PACKAGES, INTERIOR PACKAGES, AND EXTERNAL CONTAINERS SHALL BE MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, THE NASA DRAWING NUMBER AND REVISION LETTER.
     - (2) UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002047.
2. INSPECTION AND ACCEPTANCE:
   - A. MINIMUM MARKING: MARK PERMANENTLY AND LEGIBLY WITH NASA DRAWING NUMBER AND REVISION LETTER, MANUFACTURER'S NAME OR SYMBOL, MANUFACTURER'S SERIAL NUMBER AND LEAD IDENTIFICATION. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART AND PACKAGE.
   - B. LEADS: NICKEL ALLOY 0.020 DIA ± .001, LEADS SHALL CONFORM TO ND 1015400. A CERTIFICATION OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
   - C. UNIT SHALL MEET ALL REQUIREMENTS OF TABLE I.
3. DESIGN REQUIREMENTS:
   - A. THE UNIT SHALL MEET ALL REQUIREMENTS OF MIL-T-27 FOR GRADE 5, CLASS R, LIFE EXPECTANCY X IN AN AMBIENT TEMPERATURE OF 85°C. EXCEPT QUALIFICATION AND LIFE TEST UNDER GROUP C INSPECTION TESTS WHICH SHALL BE WAIVED.
   - B. RATED POWER LEVEL: 1 MW
   - C. WORKING VOLTAGE: 50 VOLTS MAX'MUM
4. SPECIAL CONDITIONING (100%) BY MANUFACTURER:
   - A. EACH TRANSFORMER SHALL BE BURNED-IN FOR 50 HOURS AT AN AMBIENT TEMPERATURE OF +90°C AT 1 MILLIWATT POWER OUTPUT AND 1 MILLIAMPERE DC IN THE PRIMARY (1-2), AFTER BURN-IN, TRANSFORMERS SHALL MEET SPECIFICATION REQUIREMENTS.



VOLTAGES AND CURRENTS
ARE RMS VALUES UNLESS
OTHERWISE NOTED.

SCHEMATIC DIAGRAM



MASTER

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ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO Contract NAS 9-497
DRAWN D. Gobbert DATE 15 NOV 63
CHECKED Ed Foster 18 Nov 63
APPROVAL D. R. Test 16 DEC 63
APPROVAL
NASA APPROVAL 12/17/63
MIT APPROVAL 17 Dec 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER, AUDIO FREQUENCY
(1:3 TURNS RATIO)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010710
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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— 1010710

REVISIONS 05234

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 05234		RDK WK

TABLE I
INSPECTION TESTS

NUMBERS IN PARAGRAPH COLUMN REFER TO PARAGRAPH NUMBERS IN SPECIFICATION MIL-T-27.	
PARAGRAPH	
4.7.3.2.1	SEALING
4.7.5	DIELECTRIC STRENGTH: APPLY 500 VOLTS (RMS) BETWEEN WINDINGS
4.7.7	INSULATION RESISTANCE: 10,000 MEGOHMS MINIMUM AT 25°C.
4.7.9.3	DC RESISTANCE: R(1-2) = 985 OHMS ± 20%; R(3-5) = 4400 OHMS ± 20%
4.7.9.7	FREQUENCY RESPONSE: (REFERENCE FREQUENCY 1000 CPS) ± 5 db FROM 70 CPS TO 300 CPS ± 3 db FROM 300 CPS TO 15 KC. ES SHALL BE DETERMINED AT 1KC WITH AN OUTPUT LOAD (3-4) OF 135,000 OHMS AT 1 MW, A SOURCE IMPEDANCE OF 15,000 OHMS AND 1 MADC, ES SHALL BE HELD CONSTANT OVER THE FREQUENCY RANGE.
4.7.9.14	POLARITY: LEADS 1 AND 3 SHALL BE OF LIKE POLARITY.
4.7.9.17	NO LOAD VOLTAGE RATIO: WITH 1 VOLT, 1000 CPS APPLIED (1-2), V(1-2)/V(3-5) = 1:3 ± 3%, ALSO V(3-4)/V(4-5) = 1:1 ± 2%.
	PRIMARY IMPEDANCE (1-2): 6500 OHMS MINIMUM WITH 4 VOLTS, 1000 CPS, 1 MADC APPLIED (1-2), SECONDARY OPEN.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
NONE

MIT
INSTRUMENTATION LAB
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DWG. NO. Contract NAS 9-497

DRAWN D. Dobbert DATE 15NOV63
CHECKED Ed Foster 18 Nov 63
APPROVAL D. R. Test 16 DEC 63
APPROVAL
NASA APPROVAL 12/17/63
MIT APPROVAL Dec 63

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HOUSTON, TEXAS

TRANSFORMER, AUDIO FREQUENCY
(1:3 TURNS RATIO)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	C	1010710

SCALE NONE WT SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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A 1010712

REVISIONS

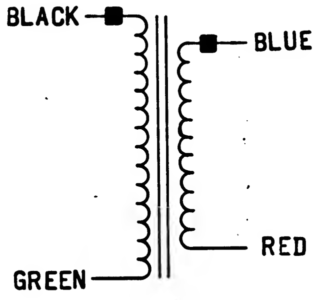
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 08237	12 May 64	WK
A	REVISED PER TDRR 15255	1/26/65	WK

REQUIREMENTS:

1. GENERAL:
   - A. DESIGN TO BE IN CONFORMANCE WITH SPECIFICATION MIL-T-27 AND ND 1015401 (FOR LEADS) AS PROVIDED BELOW.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN SPECIFICATION ND 1015404, CLASS 2.
   - C. INTERPRET IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

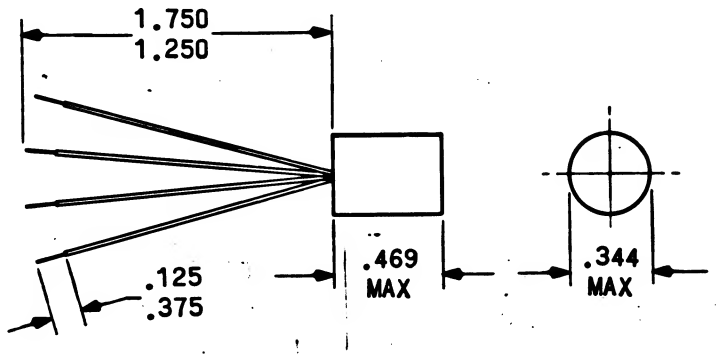
2. INSPECTION AND ACCEPTANCE:
   - A. UNIT SHALL MEET ALL REQUIREMENTS OF TABLE I.
   - B. MARKING: MARK PERMANENTLY AND LEGIBLY WITH THE NASA DRAWING NUMBER AND REVISION LETTER, MANUFACTURER'S SERIAL NUMBER AND CONNECTION DATA. THE MANUFACTURER'S PART OR TYPE NUMBER MAY APPEAR ON THE PART AND PACKAGE PER ND1002015 AND MIL-STD-129.
   - C. LEADS: LEAD MATERIAL SHALL BE DUMET ALLOY PER ND-1015401 EXCEPT NICKEL STRIKE MAY BE 50-100 MICROINCHES AND LEAD DIAMETER SHALL BE 0.016 ± .001 DIA. A CERTIFICATION OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT. LEADS SHALL BE NYLON INSULATED, COLOR CODED PER SCHEMATIC DIAGRAM AND ENDS SHALL BE STRIPPED AS SHOWN.

3. DESIGN REQUIREMENTS:
   - A. THIS UNIT SHALL MEET ALL REQUIREMENTS OF MIL-T-27 FOR GRADE 4, CLASS R LIFE EXPECTANCY X, FAMILY 16, IN AN AMBIENT TEMPERATURE OF 85°C.
   - B. THE UNIT SHALL MEET ALL ELECTRICAL REQUIREMENTS EXCEPT WHERE NOTED, BEFORE, DURING, AND AFTER THE FOLLOWING EXPOSURES:
     - (1) HIGH TEMPERATURE: 71°C OPERATING
     - (2) LOW TEMPERATURE: -18°C OPERATING
     - (3) VIBRATION: 10 TO 2000 CPS, 20 G (PER MIL-STD-202, METHOD 204A, CONDITION D)
     - (4) REDUCED PRESSURE: 96 HOURS AT A PRESSURE OF 10^{-4} MM OF MERCURY
   - C. DC UNBALANCE IN PRIMARY: 0 MA MAXIMUM
   - D. RATED POWER LEVEL: 25 MW
   - E. WORKING VOLTAGE BETWEEN WINDINGS AND FROM WINDINGS TO CASE: 49 VOLTS MAXIMUM INSTANTANEOUS.



SCHEMATIC DIAGRAM

VOLTAGES AND CURRENTS ARE RMS VALUES UNLESS OTHERWISE NOTED. RESISTANCES ARE D.C. VALUES AT 25°C



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
Contract NAS 9-497
DWG. NO
DRAWN J. Parks DATE 27NOV63
CHECKED Ed Foster 29 Nov 63
APPROVAL D. Pitest 5/12/64
APPROVAL
NASA APPROVAL 5/12/64
MIT APPROVAL 12 May 64

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TRANSFORMER, AUDIO FREQUENCY
(14.14:1 TURNS RATIO)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010712
SCALE NONE
WT
SHEET 1 OF 2

1010712 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010712 A

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 08237	12 May 64	wlc
A	REVISED PER TDRR 15255	1/26/65	wlc

REQUIREMENTS (CONTINUED)

4. SPECIAL CONDITIONING (BY MANUFACTURER):
   A. TRANSFORMER SHALL BE TEMPERATURE CYCLED FOR 5 CYCLES PER MIL-STD-202B METHOD 102A EXCEPT THAT THE TEMPERATURES SHALL BE -55°C, +25°C AND +105°C AND EXPOSURE TIME SHALL BE 15 MINUTES AT EACH TEMPERATURE. DURING THE LAST CYCLE THE UNIT SHALL BE TESTED FOR CONTINUITY AT EACH OF THE AMBIENT CONDITIONS. AFTER STABILIZATION AT ROOM TEMPERATURE UNIT SHALL PASS NORMAL PRODUCTION TESTS.

TABLE I
INSPECTION TESTS

	SEE MIL-T-27A FOR TEST PROCEDURES
	SEALING: IMMERSE IN LIQUID AS INDICATED
	DIELECTRIC STRENGTH: APPLY 200 VOLTS (RMS) BETWEEN WINDINGS AND BETWEEN WINDINGS AND CASE.
	INDUCED VOLTAGE: APPLY 140 VOLTS, 2000 CPS TO LEADS BLACK AND GREEN, SECONDARY OPEN.
	INSULATION RESISTANCE: 10,000 MEGOHMS MINIMUM AT 25°C. (USE 100 VDC MAX.)
	DC RESISTANCE (AT 25°C): R(BLACK-GREEN)=10,625 OHMS MAXIMUM, R(BLUE-RED)=125 OHMS MAXIMUM.
	INDUCTANCE: SHALL BE 25^{+5}_{-4} hy WITH 5 VOLTS, 1000 CPS, 0 MADC (BLACK TO GREEN).
	DISTORTION (AT 1 KC): 5% MAXIMUM WITH 2000 OHM LOAD AT 25 MW OUTPUT.
	FREQUENCY RESPONSE: (REFERENCE FREQUENCY 1000 CPS) ±4DB FROM 300 CPS TO 20 KC, E_S SHALL BE DETERMINED AT 1 KC WITH AN OUTPUT LOAD BLUE TO RED OF 1000 OHMS AT 1 MW, A SOURCE IMPEDANCE OF 200,000 OHMS AND 0 MADC. E_S SHALL BE HELD CONSTANT OVER THE FREQUENCY RANGE.
	POLARITY: LEADS BLACK AND BLUE SHALL BE OF LIKE POLARITY.
	NO LOAD VOLTAGE RATIO: WITH 5 VOLTS, 1 KC (BLACK TO GREEN), V(BLACK TO GREEN)/V(BLUE TO RED)=14.14:1 ± 3%.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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DRAWN J. Parks DATE 27NOV63
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APPROVAL
NASA APPROVAL 5/12/64
MIT APPROVAL 12 May 64

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TRANSFORMER, AUDIO FREQUENCY
(14.14:1 TURNS RATIO)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010712
SCALE WT SHEET 2 OF 2

1010712

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— 1010712

REVISIONS

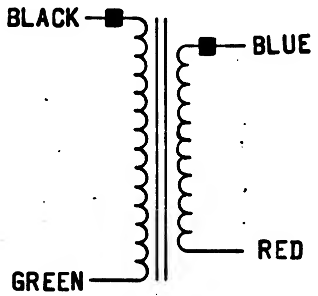
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 08237	12 May 64	WK

REQUIREMENTS:

1. GENERAL:
   - A. DESIGN TO BE IN CONFORMANCE WITH SPECIFICATION MIL-T-27 AND ND 1015401 (FOR LEADS) AS PROVIDED BELOW.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN SPECIFICATION ND 1015404, CLASS 2.
   - C. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

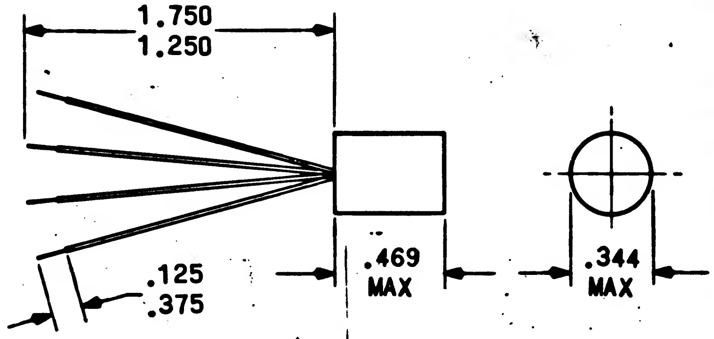
2. INSPECTION AND ACCEPTANCE:
   - A. UNIT SHALL MEET ALL REQUIREMENTS OF TABLE I.
   - B. MARKING: MARK PERMANENTLY AND LEGIBLY WITH THE NASA DRAWING NUMBER AND REVISION LETTER, MANUFACTURER'S SERIAL NUMBER AND CONNECTION DATA. THE MANUFACTURER'S PART OR TYPE NUMBER MAY APPEAR ON THE PART AND PACKAGE.
   - C. LEADS: THE ULTIMATE LEAD MATERIAL IS DUMET ALLOY 0.016 ± 0.001 DIA. UNTIL THIS MATERIAL IS AVAILABLE IN PRODUCTION (AT WHICH TIME THIS DRAWING WILL BE UPDATED BY CHANGE) THE LEAD MATERIAL SHALL BE DUMET ALLOY 0.017 ± 0.002 DIA., GOLD PLATED AND NYLON INSULATED. LEADS SHALL BE COLOR CODED AND ENDS SHALL BE STRIPPED AS SHOWN. IN ALL OTHER RESPECTS, LEADS SHALL CONFORM TO ND 1015401. A CERTIFICATION OF COMPLIANCE WITH THIS LEAD MATERIAL REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
   - D. FINISH: BLACK, SHADE NO. 37038 PER FED-STD-595.
   - E. DIMENSIONS PER FIGURE.

3. DESIGN REQUIREMENTS:
   - A. THIS UNIT SHALL MEET ALL REQUIREMENTS OF MIL-T-27 FOR GRADE 4, CLASS R LIFE EXPECTANCY X, FAMILY 16, IN AN AMBIENT TEMPERATURE OF 85°C.
   - B. THE UNIT SHALL MEET ALL ELECTRICAL REQUIREMENTS EXCEPT WHERE NOTED, BEFORE, DURING, AND AFTER THE FOLLOWING EXPOSURES:
     - (1) HIGH TEMPERATURE: 71°C OPERATING
     - (2) LOW TEMPERATURE: -18°C OPERATING
     - (3) VIBRATION: 10 TO 2000 CPS, 20 G (PER MIL-STD-202, METHOD 204A, CONDITION D)
     - (4) REDUCED PRESSURE: 96 HOURS AT A PRESSURE OF 10^{-4} MM OF MERCURY
   - C. DC UNBALANCE IN PRIMARY: 0 MA MAXIMUM
   - D. RATED POWER LEVEL: 25 MW
   - E. WORKING VOLTAGE BETWEEN WINDINGS AND FROM WINDINGS TO CASE: 49 VOLTS MAXIMUM INSTANTANEOUS.



SCHEMATIC DIAGRAM

VOLTAGES AND CURRENTS ARE RMS VALUES UNLESS OTHERWISE NOTED. RESISTANCES ARE D.C. VALUES AT 25°C



SHEET 1	SHEET 2
—	—

REVISION STATUS OF SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MASTER

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
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DWG. NO. Contract NAS 9-497
DRAWN J. Parks DATE 27NOV63
CHECKED Ed Foster 29 Nov 63
APPROVAL D. Pitcher 5/12/64
APPROVAL
NASA APPROVAL 5/12/64
MIT APPROVAL 12 May 64

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TRANSFORMER, AUDIO FREQUENCY
(14.14:1 TURNS RATIO)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010712
SCALE NONE WT SHEET 1 OF 2

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

INCHES
0 1 2
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—	1010712

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 08237	12 May 64	wlc

REQUIREMENTS (CONTINUED)

4. SPECIAL CONDITIONING (BY MANUFACTURER):
   A. TRANSFORMER SHALL BE TEMPERATURE CYCLED FOR 5 CYCLES PER MIL-STD-202B METHOD 102A EXCEPT THAT THE TEMPERATURES SHALL BE -55°C, +25°C AND +105°C AND EXPOSURE TIME SHALL BE 15 MINUTES AT EACH TEMPERATURE. DURING THE LAST CYCLE THE UNIT SHALL BE TESTED FOR CONTINUITY AT EACH OF THE AMBIENT CONDITIONS. AFTER STABILIZATION AT ROOM TEMPERATURE UNIT SHALL PASS NORMAL PRODUCTION TESTS.

TABLE I

INSPECTION TESTS

SEE MIL-T-27A FOR TEST PROCEDURES	
	SEALING
	DIELECTRIC STRENGTH: APPLY 200 VOLTS (RMS) BETWEEN WINDINGS AND BETWEEN WINDINGS AND CASE.
	INDUCED VOLTAGE: APPLY 140 VOLTS, 2000 CPS TO LEADS BLACK AND GREEN, SECONDARY OPEN.
	INSULATION RESISTANCE: 10,000 MEGOHMS MINIMUM AT 25°C. (USE 100 VDC MAX.)
	DC RESISTANCE (AT 25°C): R(BLACK-GREEN)=10,625 OHMS MAXIMUM, R(BLUE-RED)=125 OHMS MAXIMUM.
	INDUCTANCE: SHALL BE 21 HENRIES MINIMUM WITH 5 VOLTS, 1000 CPS, 0 MADC 30 MAX (BLACK TO GREEN).
	DISTORTION (AT 1 KC): 5% MAXIMUM WITH 2000 OHM LOAD AT 25 MW OUTPUT.
	FREQUENCY RESPONSE: (REFERENCE FREQUENCY 1000 CPS) ±3 DB FROM 300 CPS TO 20 KC, E_S SHALL BE DETERMINED AT 1 KC WITH AN OUTPUT LOAD BLUE TO RED OF 1000 OHMS AT 1 MW, A SOURCE IMPEDANCE OF 200,000 OHMS AND 0 MADC. E_S SHALL BE HELD CONSTANT OVER THE FREQUENCY RANGE.
	POLARITY: LEADS BLACK AND BLUE SHALL BE OF LIKE POLARITY.
	NO LOAD VOLTAGE RATIO: WITH 5 VOLTS, 1 KC (BLACK TO GREEN), V(BLACK TO GREEN)/V(BLUE TO RED)=14.14:1 ± 3%.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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INSTRUMENTATION LAB
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DWG. NO.
Contract NAS 9-497
DRAWN J. Parks DATE 27NOV63
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APPROVAL
NASA APPROVAL 5/12/64
MIT APPROVAL 12 May 64

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TRANSFORMER, AUDIO FREQUENCY
(14.14:1 TURNS RATIO)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010712
SCALE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

— 1010713

	REVISIONS 07585		
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 07585	4/14/64	WR

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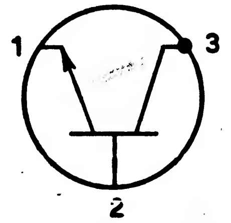
REQUIREMENTS:

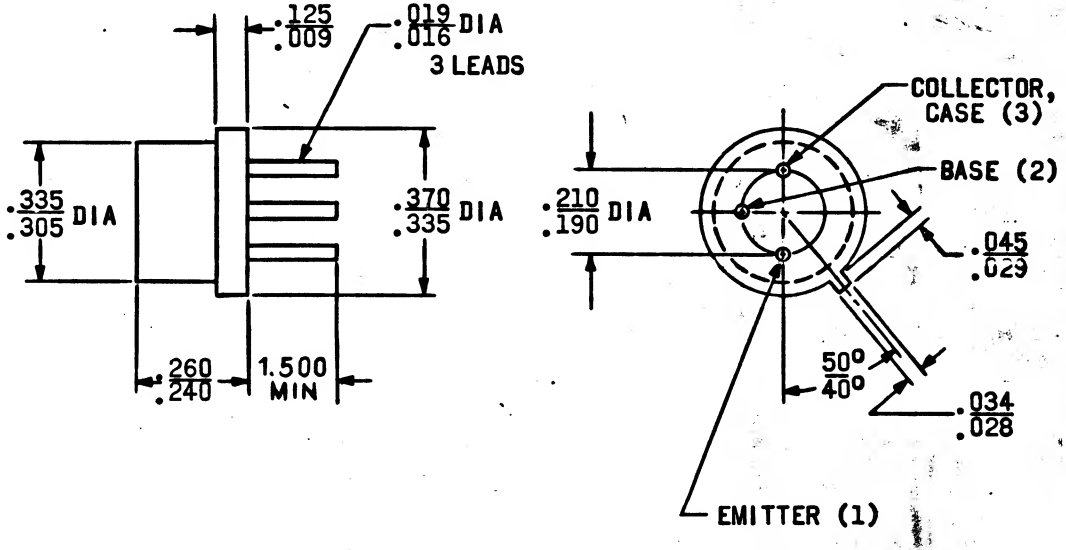
1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. THE SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - C. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002051 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - D. PACKAGING AND PACKING: UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-S-19491, LEVEL A.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MARKING: THE NASA DRAWING NUMBER WHICH SHALL CONSIST OF AT LEAST THE LAST THREE DIGITS, REVISION LETTER AND THE MANUFACTURER'S NAME, TRADEMARK, OR CODE; DATE CODE; AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER MIL-STD-130. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-S-19491 AND SHALL INCLUDE THE NASA DRAWING NUMBER AND REVISION LETTER.
     - (2) LEAD DATA: KOVAR, GOLD PLATED PER ND 1015402. A CERTIFICATE OF COMPLIANCE FOR THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
     - (3) DIMENSIONS PER DRAWING
   - B. ELECTRICAL REQUIREMENTS: PER TABLE II.
     - (1) COLLECTOR CUTOFF CURRENT I_{CBO} AT 100°C
     - (2) SWITCHBACK VOLTAGE, LV_{CEO}
     - (3) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}, h_{FE2}, h_{FE3}
     - (4) BASE SATURATION VOLTAGE, $V_{BE(SAT)1}$
     - (5) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)1}$

3. DESIGN REQUIREMENTS:
   - A. STORAGE TEMPERATURE (T_{stg}): -65° TO +200°C.
   - B. JUNCTION OPERATING TEMPERATURE (T_J): +200°C MAXIMUM.
   - C. ELECTRICAL RATINGS: PER TABLE I.
   - D. ELECTRICAL CHARACTERISTICS: PER TABLE II.
   - E. POWER DISSIPATION:
     - (1) AT +25°C CASE TEMPERATURE: 5.0 WATTS.
       - (a) THERMAL RESISTANCE (θ_{JC}): 35°C/WATT
     - (2) AT +25°C AMBIENT TEMPERATURE: 800 MILLIWATTS
       - (a) THERMAL RESISTANCE (θ_{JA})" 219°C/WATT



GRAPHICAL SYMBOL



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

—	—	—
SHEET 1	SHEET 2	SHEET 3
REVISION STATUS OF SHEETS		

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
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DWG. NO. Contract NAS 9-497
DRAWN Patterson DATE 28 JAN 64
CHECKED Ed Foster 29 JAN 64
APPROVAL 13 APR 64
APPROVAL
NASA APPROVAL 4/1/64
MIT APPROVAL 14 Apr 64

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HOUSTON, TEXAS

TRANSISTOR, NPN, SILICON

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010713
SCALE NONE
WT
SHEET 1 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS 07585

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 07585	4/14/64	WK

REQUIREMENTS: (CONTINUED)

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. BURN-IN: PARTS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
     - (1) AMBIENT TEMPERATURE, T_A = +25° ± 5°C.
     - (2) COLLECTOR VOLTAGE, V_{CB} = 40 VOLTS DC.
     - (3) POWER DISSIPATION: 460 MILLIWATTS ± 10 PERCENT.
   - B. THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
     - (1) SWITCHBACK VOLTAGE, LV_{CEO}
     - (2) COLLECTOR CUTOFF CURRENT, I_{CBO} AT T_C = +25°C
     - (3) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)1}$
     - (4) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}
   - C. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF THE ABSOLUTE VALUE OF EACH CHARACTERISTIC AND TO SHOW THE FREQUENCY DISTRIBUTION OF THE PERCENT CHANGE OF EACH CHARACTERISTIC FROM ITS INITIAL READING. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVE CHANGED MORE THAN ±20% IN h_{FE} OR HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} (THE ABSOLUTE INCREASE MUST BE GREATER THAN 5 nAno AMPERES) SHALL NOT BE ACCEPTABLE.

T_{on} AND T_{off} TEST CIRCUIT

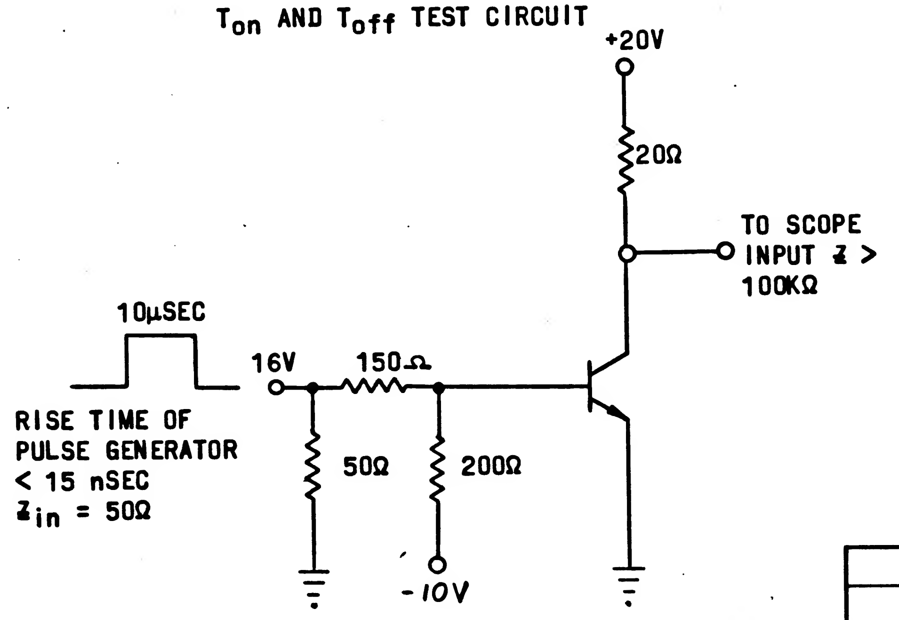

FIGURE 1

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN Patterson DATE 28 JAN 64
CHECKED Ed Foster 29 JAN 64
APPROVAL 13 APR 64
APPROVAL
NASA APPROVAL 4/14/64
MIT APPROVAL 14 Apr 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR, NPN, SILICON

SPECIFICATION CONTROL DRAWING.

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010713
SCALE
WT
SHEET 2 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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—	1010713

REVISIONS 07585			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 07585	4/14/64	WK

TABLE I

NASA DASH NO	MAXIMUM RATINGS TC = +25°C				
	COLLECTOR VOLTAGE V_{CBO}	EMITTER VOLTAGE V_{EBO}	COLLECTOR VOLTAGE V_{CEO}	COLLECTOR POWER DISSIPATION	EIA TYPE DESIGNATION (FOR REF ONLY)
	VDC	VDC	VDC	W	
-1	100	5	80	5.0	2N2891

TABLE II

ELECTRICAL CHARACTERISTICS AT TC = +25°C (UNLESS OTHERWISE SPECIFIED)						
PARAMETER	CONDITION	SYMBOL	SPECIFICATION LIMITS			
			MIN	TYP	MAX	UNIT
STATIC FORWARD CURRENT TRANSFER RATIO NOTE 1	I_C=1.0A, V_{CE}=2.0V	h_{FE1}	50	80	150	
	I_C=2.0A, V_{CE}=5.0V	h_{FE2}	40	75		
	I_C=100MA, V_{CE}=2.0V	h_{FE3}	35	80		
COLLECTOR SATURATION VOLTAGE NOTE 1	I_C=1.0A, I_B=0.1A	$V_{CE(SAT)1}$		0.2	0.57	VOLTS
	I_C=2.0A, I_B=0.2A	$V_{CE(SAT)2}$		0.35	0.90	VOLTS
BASE SATURATION VOLTAGE NOTE 1	I_C=1.0A, I_B=0.1A	$V_{BE(SAT)1}$		1.0	1.23	VOLTS
	I_C=2.0A, I_B=0.2A	$V_{BE(SAT)2}$		1.1	1.37	VOLTS
COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=80V	I_{CBO}		5	20	NA
	I_E=0, V_{CB}=80V, T_C=+100°C	I_{CBO}		.7	5	μA
	I_E=0, V_{CB}=80V, T_C=+150°C	I_{CBO}		5	20	μA
COLLECTOR CUTOFF CURRENT	I_B=0, V_{CE}=60V	I_{CEO}		1.0	10	μA
SMALL SIGNAL CURRENT GAIN	I_C=50MA, V_{CE}=10.0, f=1KC	h_{fe}	50	90		
OUTPUT CAPACITANCE	I_E=0, V_{CB}=10V	C_{OB}		38	70	PF
SWITCHBACK VOLTAGE NOTE 1	I_C=100MA, I_B=0	LV_{CEO}	80			VOLTS
TURN ON TIME FIGURE 1	I_C=1.0A, $I_{B1} \approx$ 50MA	T_{on}			0.3	μSEC
TURN OFF TIME FIGURE 1	I_C=1.0A, $I_{B1}=I_{B2} \approx$ 50MA	T_{off}			1.5	μSEC

NOTE 1 PULSED: LENGTH ≤ 300 μSEC; DUTY CYCLE ≤ 1%

THE PART NUMBER IS THE DRAWING NUMBER
PLUS THE APPLICABLE DASH NUMBER.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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DWG. NO. Contract NAS 9-497
DRAWN Patterson DATE 28 JAN 64
CHECKED Ed Foster 29 JAN 64
APPROVAL D. [illegible] 13 APR64
APPROVAL
NASA APPROVAL W. S. [illegible]
MIT APPROVAL WKupfer 14Apr64

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	C	1010713
SCALE	WT	SHEET 3 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010715 A

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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 07488	4/7/64	WM
A	REVISED PER TDRR 21423	8/31/65	WK.

REQUIREMENTS:

1. GENERAL:
   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

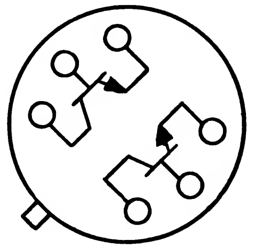
   B. THE SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   C. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002051 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   D. PACKAGING AND PACKING: UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH ND1002215, CLASS I, CODE 2

2. INSPECTION AND ACCEPTANCE:
   A. MECHANICAL REQUIREMENTS:
      (1) MARKING: THE NASA DRAWING NUMBER (WHICH SHALL CONSIST OF AT LEAST THE LAST THREE DIGITS) AND THE MANUFACTURER'S NAME, TRADEMARK, OR CODE, DATE CODE, AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND1002019

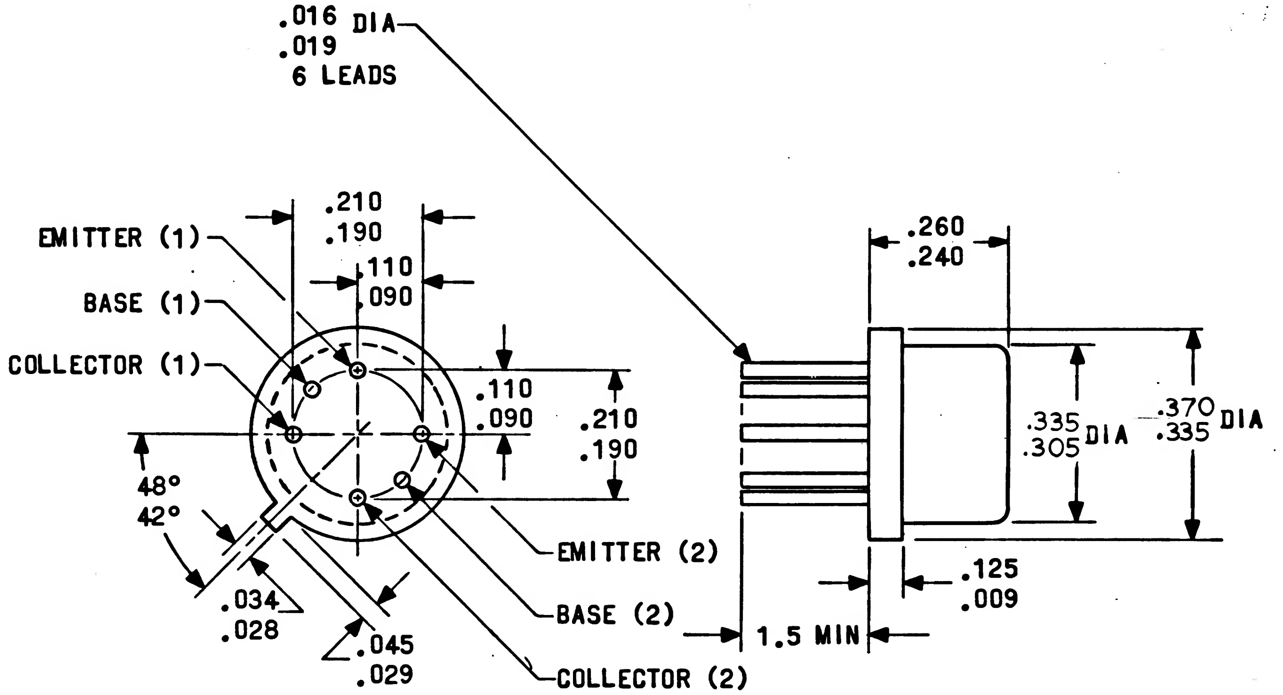
      (2) LEAD DATA: KOVAR, GOLD PLATED PER ND 1015402. A CERTIFICATE OF COMPLIANCE FOR THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
      (3) DIMENSIONS PER DRAWING
   B. ELECTRICAL REQUIREMENTS: PER TABLE II.
      (1) COLLECTOR CUTOFF CURRENT I_{CBO} AT 100°C
      (2) SWITCHBACK VOLTAGE, LV_{CEO}
      (3) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}, h_{FE2}, h_{FE3}
      (4) BASE SATURATION VOLTAGE, $V_{BE(SAT)}$
      (5) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$

3. DESIGN REQUIREMENTS:
   A. JUNCTION TEMPERATURE: -65°C TO +200°C.
   B. ELECTRICAL RATING: PER TABLE I.
   C. ELECTRICAL SPECIFICATION: PER TABLE II.
   D. POWER DISSIPATION (EACH SIDE):
      (1) AT 25°C AMBIENT TEMPERATURE: 500 MILLIWATTS MAXIMUM.
         (a) DERATING: 350°C/WATT
      (2) AT 25°C CASE TEMPERATURE: 1.5 WATTS MAXIMUM.
         (a) DERATING: 117°C/WATT
   E. POWER DISSIPATION (DUAL DEVICE):
      (1) AT 25°C AMBIENT TEMPERATURE: 600 MILLIWATTS MAXIMUM.
         (a) DERATING: 292°C/WATT.
      (2) AT 25° CASE TEMPERATURE: 3.0 WATTS MAXIMUM.
         (a) DERATING: 58.3°C/WATT.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



GRAPHICAL SYMBOL



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
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DWG. NO. Contract NAS 9-497
DRAWN Patterson DATE 30 JAN 64
CHECKED Ed Foster 3 FEB 64
APPROVAL D. B. Test 7 APR 64
APPROVAL
NASA APPROVAL 4/7/64
MIT APPROVAL 7 Apr 64

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010715
SCALE NONE WT SHEET 1 OF 4

1010715 A

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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 07488	4/7/64	WK
A	REVISIED PER TDRR 21423	8/3/65	WK

REQUIREMENTS: (CONTINUED)

4. SPECIAL CONDITIONING BY SUPPLIER:
   A. BURN IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
      (1) AMBIENT TEMPERATURE: +25° ± 5°C.
      (2) COLLECTOR VOLTAGE V_{CB}: 20 ± 1 VOLT PER SIDE.
      (3) POWER DISSIPATION: 342 MILLIWATTS TOTAL (171 MILLIWATTS PER SIDE) (T_J=+125°C).
   B. THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
      (1) SWITCHBACK VOLTAGE, LV_{CEO}
      (2) COLLECTOR CUTOFF CURRENT, I_{CBO} AT T_A=25°C.
      (3) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)1}$
      (4) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}
   C. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS.

UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN h_{FE} OR HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} (THE ABSOLUTE INCREASE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.

T_{on} AND T_{off} TEST CIRCUIT

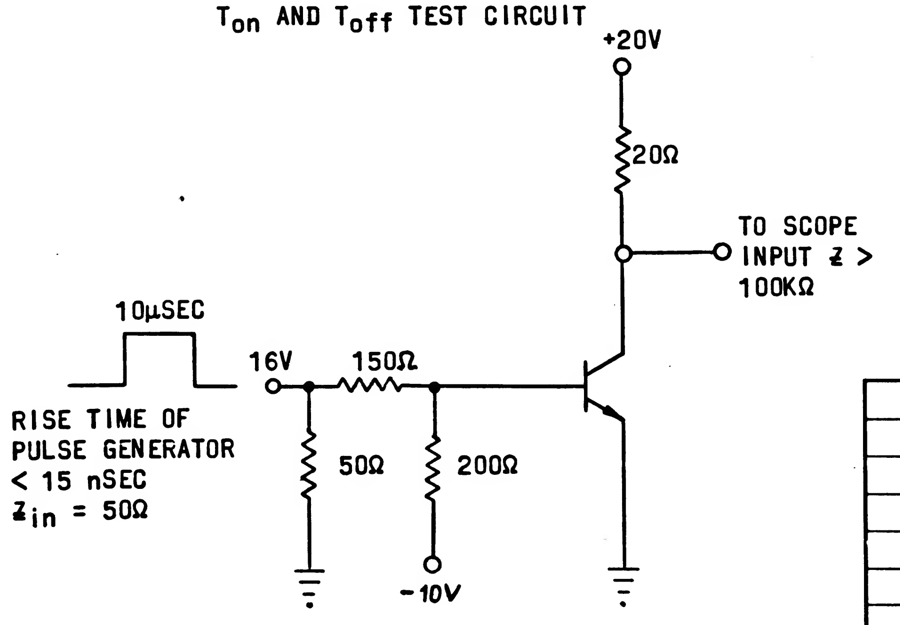

FIGURE 1

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT
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DRAWN Patterson DATE 30 JAN 64
CHECKED Ed Foster 3 FEB 64
APPROVAL D. A. Test 7 APR 64
APPROVAL
NASA APPROVAL 4/7/64
MIT APPROVAL

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010715
SCALE	WT	SHEET 2 OF 4

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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 07488	4/7/64	WR.
A	REVISED PER TDRR 21423	8/31/65	WR

TABLE 11

NASA DASH NO.	ELECTRICAL CHARACTERISTICS AT TC = +25°C (UNLESS OTHERWISE SPECIFIED)			SPECIFICATION LIMITS			
	PARAMETER	CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
-1	STATIC FORWARD CURRENT TRANSFER RATIO NOTE 1	I_C=1.0A, V_{CE}=2.0V	hFE1	50	80	150	
		I_C=2.0A, V_{CE}=5.0V	hFE2	40	75		
		I_C=100MA, V_{CE}=2.0V	hFE3	35	80		
	COLLECTOR SATURATION VOLTAGE NOTE 1	I_C=1.0A, I_B=0.1A	V_{CE}(SAT)1		0.2	0.57	VOLTS
		I_C=2.0A, I_B=0.2A	V_{CE}(SAT)2		0.35	0.90	VOLTS
	BASE SATURATION VOLTAGE NOTE 1	I_C=1.0A, I_B=0.1A	V_{BE}(SAT)1		1.0	1.23	VOLTS
		I_C=2.0A, I_B=0.2A	V_{BE}(SAT)2		1.1	1.37	VOLTS
	COLLECTOR CUTOFF CURRENT	I_E=0. V_{CB}=80V	I_{CBO}		5	15	NA
		I_E=0, V_{CB}=80V, T_C=+100°C	I_{CBO}		0.7	5.0	μA
		I_E=0, V_{CB}=80V, T_C=+150°C	I_{CBO}		5	20	μA
	COLLECTOR CUTOFF CURRENT	I_B=0, V_{CE}=60V	I_{CEO}		1.0	50	μA
	SMALL SIGNAL CURRENT GAIN	I_C=50MA, V_{CE}=10V, f=1KC	hfe	50	90		
	OUTPUT CAPACITANCE	I_E=0, V_{CB}=10V	C_{OB}		38	70	PF
	SWITCHBACK VOLTAGE NOTE 1	I_C=100MA, I_B=0	LV_{CEO}	80			VOLTS
	TURN ON TIME FIGURE 1	I_C=1.0A, $I_{B1} \approx$ 50MA	T_{ON}			0.3	μ SEC
	TURN OFF TIME FIGURE 1	I_C=1.0A, $I_{B1}=I_{B2} \approx$ 50MA	T_{OFF}			1.5	μ SEC
-2	COLLECTOR TO EMITTER VOLTAGE	I_C=100MA, I_B=0	LV_{CEO}	90			VOLTS
	COLLECTOR TO BASE VOLTAGE	I_C=100μA, I_E=0	BV_{CBO}	120			VOLTS
	EMITTER TO BASE VOLTAGE	I_E=100μA, I_C=0	BV_{EBO}	8.0			VOLTS
	COLLECTOR SATURATION VOLTAGE* NOTE 1	I_C=100MA, I_B=10MA	V_{CE}(SAT)			0.2	VOLTS
	COLLECTON SATURATION VOLTAGE* NOTE 1	I_C=2 AMP., I_B=200MA	V_{CE}(SAT)			0.8	VOLTS
	BASE SATURATION VOLTAGE* NOTE 1	I_C=100MA, I_B=10, MA	V_{BE} (SAT)			0.8	VOLTS
	BASE SATURATION VOLTAGE* NOTE 1	I_C=2 AMP., I_B=200MA	V_{BE} (SAT)			1.4	VOLTS
	DC CURRENT GAIN* NOTE 1	I_C=10MA, V_{CE}=2V	h_{FE1}	20			

TABLE 1

MAXIMUM RATINGS TC = +25°C

NASA DASH NO.	COLLECTOR VOLTAGE V_{CBO}	EMITTER VOLTAGE V_{EBO}	COLLECTOR VOLTAGE V_{CEO}	COLLECTOR POWER DISSIPATION
-1	V_{DC}	V_{DC}	V_{DC}	W
	120	5	100	3.0 (1.5 PER UNIT)
-2	120	8	100	3.0 (1.5 PER UNIT)

*NOTE 1 PULSED: LENGTH ≤ 300 μSEC; DUTY CYCLE ≤ 1%

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LIST OF MATERIALS

NEXT ASSY	USED ON
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MATERIAL

HEAT TREATMENT

FINAL FINISH

MIT
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DWG NO Contract NAS 9-497

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SPECIFICATION CONTROL DRAWING

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SCALE
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1010715 A

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REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 21423 (THIS SHEET ADDED)				WR

TABLE II (CONTINUED)

NASA DASH NO.	ELECTRICAL CHARACTERISTICS AT TC = +25°C	(UNLESS OTHERWISE SPECIFIED)		SPECIFICATION LIMITS			
-2	PARAMETER	CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
	DC CURRENT GAIN* NOTE 1	I_C =100mA., V_{CE} =2V	h_{FE2}	60			
	DC CURRENT GAIN* NOTE 1	I_C=1 AMP., V_{CE}=2V	h_{FE5}	50			
	HIGH FREQUENCY CIRCUIT GAIN	I_C=200 MA, V_{CE}=10V	h_{FE}(20mc)	1.5			
	COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=80V	I_{CBO}			15	μA
	COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=80V	I_{CBO}(150°C)			20	uA
	OUTPUT CAPACITANCE	I_E=0, V_{CB}=10V	C_{Ob}			45	pf
	OUTPUT CAPACITANCE DIFFERENCE	I_E=0, V_{CB}=10V	C_{Obh1}-C_{Ob10}			15	pf
	TURN ON TIME FIGURE 1	I_C=100MA, I_B=5MA	T_{ON}			0.3	uSEC
	TURN OFF TIME FIGURE 1	I_C=100MA, =20xI_{B1}	T_{OFF}			1.5	uSEC
		20x1_{B2}					
	DC CURRENT GAIN RATIO	I_C=100 MA, V_{CE}=2V	hFE1/ hFE2	0.8		1.0	
	V_{CE} SATURATION VOLTAGE DIFFERENCE	I_B=5MA I_C=100MA	V_{CE1} V_{CE2}			50	MV

Ⓐ THIS SHEET ADDED

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
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APPROVED MIT 31 Aug 65
APPROVED MSC
DATE

TRANSISTOR DUAL NPN
SILICON
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CODE IDENT NO. 80230
SIZE C
DRAWING NO. 1010715
SCALE ——
SHEET 4 OF 4

1010715 B

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 07488	4/7/64	WK
A	REVISED PER TDRR 21423	8/31/65	WK.
B	REVISED PER TDRR 22142	9/7/65	9/14

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REQUIREMENTS:

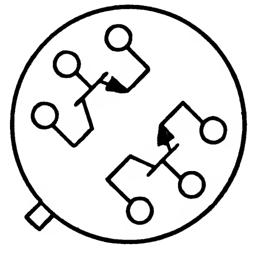
1. GENERAL:
   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

   B. THE SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   C. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002051 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   D. PACKAGING AND PACKING: UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH ND1002215, CLASS I, CODE 2

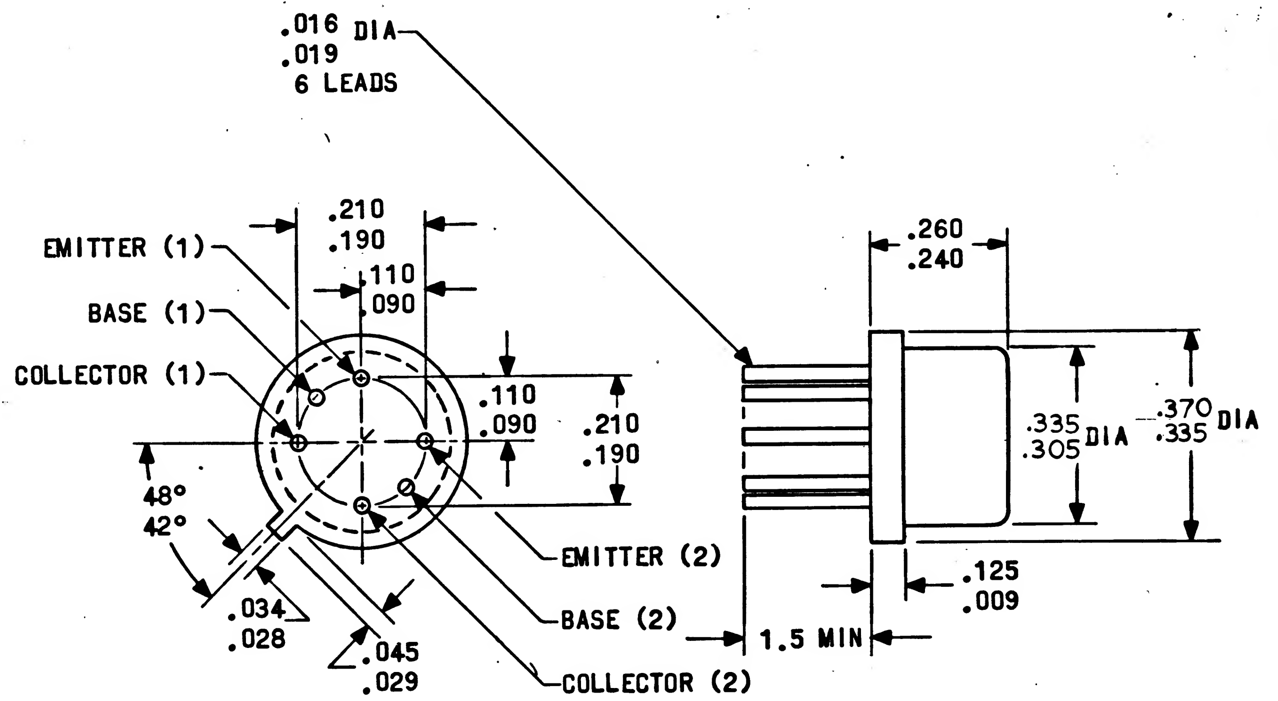
2. INSPECTION AND ACCEPTANCE:
   A. MECHANICAL REQUIREMENTS:
      (1) MARKING: THE NASA DRAWING NUMBER (WHICH SHALL CONSIST OF AT LEAST THE LAST THREE DIGITS) AND THE MANUFACTURER'S NAME, TRADEMARK, OR CODE, DATE CODE, AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND1002019

      (2) LEAD DATA: KOVAR, GOLD PLATED PER ND 1015402. A CERTIFICATE OF COMPLIANCE FOR THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
      (3) DIMENSIONS PER DRAWING
   B. ELECTRICAL REQUIREMENTS: PER TABLE II.
      (1) COLLECTOR CUTOFF CURRENT I_{CBO} AT 100°C
      (2) SWITCHBACK VOLTAGE, LV_{CEO}
      (3) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}, h_{FE2}, h_{FE3}
      (4) BASE SATURATION VOLTAGE, $V_{BE(SAT)}$
      (5) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$

3. DESIGN REQUIREMENTS:
   A. JUNCTION TEMPERATURE: -65°C TO +200°C.
   B. ELECTRICAL RATING: PER TABLE I.
   C. ELECTRICAL SPECIFICATION: PER TABLE II.
   D. POWER DISSIPATION (EACH SIDE):
      (1) AT 25°C AMBIENT TEMPERATURE: 500 MILLIWATTS MAXIMUM.
         (a) DERATING: 350°C/WATT
      (2) AT 25°C CASE TEMPERATURE: 1.5 WATTS MAXIMUM.
         (a) DERATING: 117°C/WATT
   E. POWER DISSIPATION (DUAL DEVICE):
      (1) AT 25°C AMBIENT TEMPERATURE: 600 MILLIWATTS MAXIMUM.
         (a) DERATING: 292°C/WATT.
      (2) AT 25° CASE TEMPERATURE: 3.0 WATTS MAXIMUM.
         (a) DERATING: 58.3°C/WATT.



GRAPHICAL SYMBOL



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QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

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SPECIFICATION CONTROL DRAWING

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SIZE C
NASA DRAWING NO. 1010715
SCALE NONE
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SHEET 1 OF 4

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010715 B

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 07488	4/7/64	WK
A	REVISIED PER TDRR 21423	8/13/65	WK
B	REVISED PER TDRR 22142	9/7/65	9/14

REQUIREMENTS: (CONTINUED)

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. BURN IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
     - (1) AMBIENT TEMPERATURE: +25° ± 5°C.
     - (2) COLLECTOR VOLTAGE V_{CB}: 20 ± 1 VOLT PER SIDE.
     - (3) POWER DISSIPATION: 342 MILLIWATTS TOTAL (171 MILLIWATTS PER SIDE) (T_J=+125°C).
   - B. THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
     - (1) SWITCHBACK VOLTAGE, LV_{CEO}
     - (2) COLLECTOR CUTOFF CURRENT, I_{CBO} AT T_A=25°C.
     - (3) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)1}$
     - (4) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}
   - C. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS.

UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN h_{FE} OR HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} (THE ABSOLUTE INCREASE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.

T_{on} AND T_{off} TEST CIRCUIT

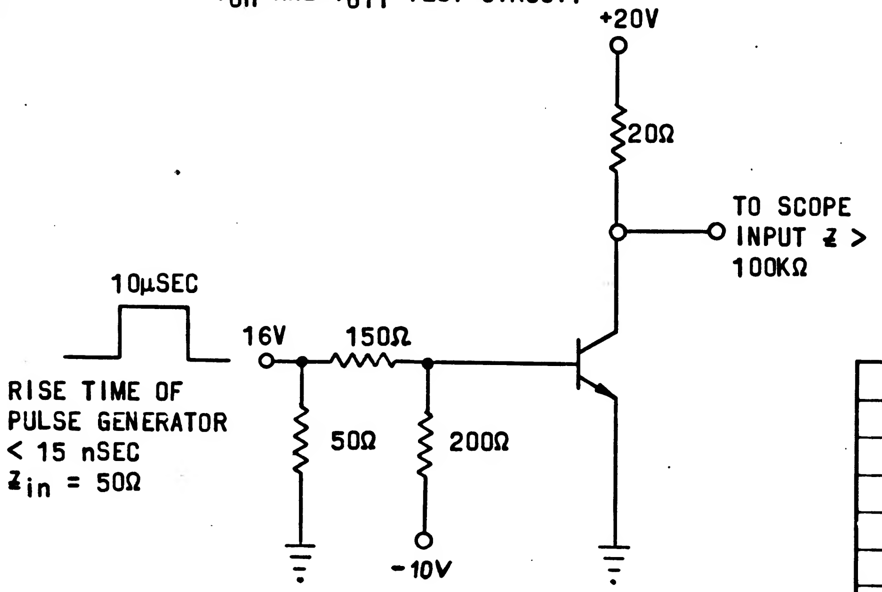

FIGURE 1

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
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CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	1010715
SCALE	WT	SHEET 2 OF 4

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B	1010715

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SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 07488	4/7/64	WR
A	REVISED PER TDRR 21423	8/31/65	WR
B	REVISED PER TDRR 22142	9/7/65	9/14

TABLE 11

NASA DASH NO.	ELECTRICAL CHARACTERISTICS AT TC = +25°C (UNLESS OTHERWISE SPECIFIED) PARAMETER	CONDITION	SYMBOL	SPECIFICATION LIMITS MIN	TYP	MAX	UNIT
-1	STATIC FORWARD CURRENT TRANSFER RATIO NOTE 1	$I_C=1.0A$, $V_{CE}=2.0V$	hFE1	50	80	150	
		$I_C=2.0A$, $V_{CE}=5.0V$	hFE2	40	75		
		$I_C=100MA$, $V_{CE}=2.0V$	hFE3	35	80		
	COLLECTOR SATURATION VOLTAGE NOTE 1	$I_C=1.0A$, $I_B=0.1A$	$V_{CE}(SAT)1$		0.2	0.57	VOLTS
		$I_C=2.0A$, $I_B=0.2A$	$V_{CE}(SAT)2$		0.35	0.90	VOLTS
	BASE SATURATION VOLTAGE NOTE 1	$I_C=1.0A$, $I_B=0.1A$	$V_{BE}(SAT)1$		1.0	1.23	VOLTS
		$I_C=2.0A$, $I_B=0.2A$	$V_{BE}(SAT)2$		1.1	1.37	VOLTS
	COLLECTOR CUTOFF CURRENT	$I_E=0$. $V_{CB}=80V$	I_{CBO}		5	15	NA
		$I_E=0$, $V_{CB}=80V$, $T_C=+100°C$	I_{CBO}		0.7	5.0	μA
		$I_E=0$, $V_{CB}=80V$, $T_C=+150°C$	I_{CBO}		5	20	μA
	COLLECTOR CUTOFF CURRENT	$I_B=0$, $V_{CE}=60V$	I_{CEO}		1.0	50	μA
	SMALL SIGNAL CURRENT GAIN	$I_C=50MA$, $V_{CE}=10V$, f=1KC	hfe	50	90		
	OUTPUT CAPACITANCE	$I_E=0$, $V_{CB}=10V$	C_{OB}		38	70	PF
	SWITCHBACK VOLTAGE NOTE 1	$I_C=100MA$, $I_B=0$	LV_{CEO}	80			VOLTS
	TURN ON TIME FIGURE 1	$I_C=1.0A$, $I_{B1} \approx 50MA$	T_{ON}			0.3	μ SEC
	TURN OFF TIME FIGURE 1	$I_C=1.0A$, $I_{B1}=I_{B2} \approx 50MA$	T_{OFF}			1.5	μ SEC
-2	COLLECTOR TO EMITTER VOLTAGE	$I_C=100MA$, $I_B=0$	LV_{CEO}	90			VOLTS
	COLLECTOR TO BASE VOLTAGE	$I_C=100\mu A$, $I_E=0$	BV_{CBO}	120			VOLTS
	EMITTER TO BASE VOLTAGE	$I_E=100\mu A$, $I_C=0$	BV_{EBO}	8.0			VOLTS
	COLLECTOR SATURATION VOLTAGE* NOTE 1	$I_C=100MA$, $I_B=10MA$	$V_{CE}(SAT)$			0.2	VOLTS
	COLLECTON SATURATION VOLTAGE* NOTE 1	$I_C=2$ AMP., $I_B=200MA$	$V_{CE}(SAT)$			0.8	VOLTS
	BASE SATURATION VOLTAGE* NOTE 1	$I_C=100MA$, $I_B=10$, MA	V_{BE} (SAT)			0.8	VOLTS
	BASE SATURATION VOLTAGE* NOTE 1	$I_C=2$ AMP., $I_B=200MA$	V_{BE} (SAT)			1.4	VOLTS
	DC CURRENT GAIN* NOTE 1	$I_C=10MA$, $V_{CE}=2V$	h_{FE1}	20			

TABLE 1

MAXIMUM RATINGS TC = +25°C

NASA DASH NO.	COLLECTOR VOLTAGE V_{CBO}	EMITTER VOLTAGE V_{EBO}	COLLECTOR VOLTAGE V_{CEO}	COLLECTOR POWER DISSIPATION
-1	V_{DC}	V_{DC}	V_{DC}	W
	120	5	100	3.0 (1.5 PER UNIT)
-2	120	8	100	3.0 (1.5 PER UNIT)

*NOTE 1 PULSED: LENGTH ≤ 300 μSEC; DUTY CYCLE ≤ 1%

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
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CODE IDENT NO. 80230
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NASA DRAWING NO. 1010715
SCALE
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SHEET 3 OF 4

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NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS							
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REVISED PER TDRR 21423 (THIS SHEET ADDED)				WR	
B		REVISED PER TDRR 22142			9/7/65	MGM	9/14

TABLE II (CONTINUED)

NASA DASH NO.	ELECTRICAL CHARACTERISTICS AT TC = +25°C	(UNLESS OTHERWISE SPECIFIED)		SPECIFICATION LIMITS			
	PARAMETER	CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
-2	DC CURRENT GAIN* NOTE 1	I_C =100mA., V_{CE} =2V	h_{FE2}	60			
	DC CURRENT GAIN* NOTE 1	I_C=1 AMP., V_{CE}=2V	h_{FE5}	50			
	HIGH FREQUENCY CIRCUIT GAIN	I_C=200 MA, V_{CE}=10V	h_{FE}(20mc)	1.5			
	COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=80V	I_{CBO}			15	MUA
	COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=80V	I_{CBO}(150°C)			20	UA
	OUTPUT CAPACITANCE	I_E=0, V_{CB}=10V	C_{Ob}			45	pF
	OUTPUT CAPACITANCE DIFFERENCE		NOTE 2 C_{OB1} - C_{OB2}			15	pF
	TURN ON TIME FIGURE 2	I_C=100MA, I_B=5MA	T_{ON}			0.3	USEC
	TURN OFF TIME FIGURE 2	I_C=100MA, =20xI_B1	T_{OFF}			1.5	USEC
		20x1_{B2}					
	DC CURRENT GAIN RATIO	I_C=100 MA, V_{CE}=2V	h_{FE1} - h_{FE2} NOTE 2	0.8		1.0	
	V_{CE} SATURATION VOLTAGE DIFFERENCE	I_B=5MA I_C=100MA	V_{CE1} - V_{CE2} NOTE 2			50	MV

NOTE 2: FOR DIFFERENCE OR RATIO TESTS, PARAMETER #1 IS DEFINED AS THE HIGHER NUMERICAL VALUE.

T ON AND T OFF TEST CIRCUIT

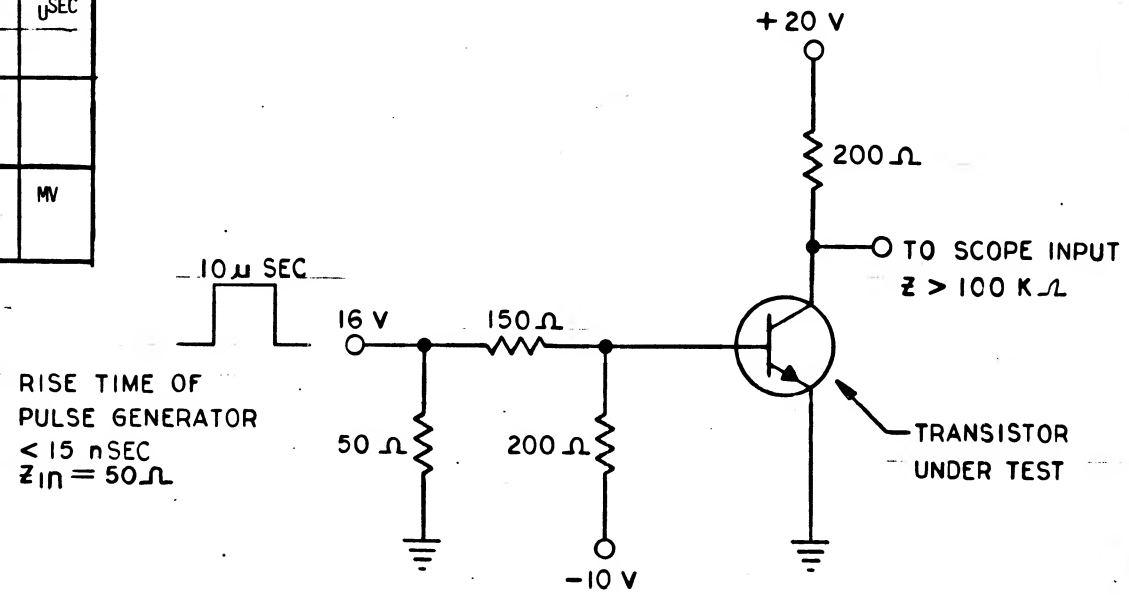

FIGURE 2

Ⓐ THIS SHEET ADDED

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

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APPROVED Aug 27,65
APPROVED
APPROVED MIT 31 Aug 65
APPROVED MSC
DATE

TRANSISTOR DUAL NPN
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SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
DRAWING NO. 1010715
SCALE —
SHEET 4 OF 4

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1010715 C

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 07488	4/7/64	wll
A	REVISED PER TDRR 21423	8/31/65	wK.
B	REVISED PER TDRR 22142	9/7/65	9/14
C	REVISED PER TDRR 23646	11/16/65	wK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. THE SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - C. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002051 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - D. PACKAGING AND PACKING: UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH ND1002215, CLASS I, CODE 2

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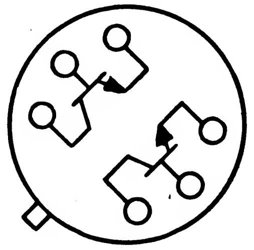
     - (2) LEAD DATA: KOVAR, GOLD PLATED PER ND 1015402. A CERTIFICATE OF COMPLIANCE FOR THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
   - B. ELECTRICAL REQUIREMENTS: PER TABLE II.
     - (1) COLLECTOR CUTOFF CURRENT I_{CBO} AT 100°C
     - (2) SWITCHBACK VOLTAGE, LV_{CEO}
     - (3) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}, h_{FE2}, h_{FE3}
     - (4) BASE SATURATION VOLTAGE, $V_{BE(SAT)}$
     - (5) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$

3. DESIGN REQUIREMENTS:
   - A. JUNCTION TEMPERATURE: -65°C TO +200°C.
   - B. ELECTRICAL RATING: PER TABLE I.
   - C. ELECTRICAL SPECIFICATION: PER TABLE II.
   - D. POWER DISSIPATION (EACH SIDE):
     - (1) AT 25°C AMBIENT TEMPERATURE: 500 MILLIWATTS MAXIMUM.
       - (a) DERATING: 350°C/WATT
     - (2) AT 25°C CASE TEMPERATURE: 1.5 WATTS MAXIMUM.
       - (a) DERATING: 117°C/WATT
   - E. POWER DISSIPATION (DUAL DEVICE):
     - (1) AT 25°C AMBIENT TEMPERATURE: 600 MILLIWATTS MAXIMUM.
       - (a) DERATING: 292°C/WATT.
     - (2) AT 25° CASE TEMPERATURE: 3.0 WATTS MAXIMUM.
       - (a) DERATING: 58.3°C/WATT.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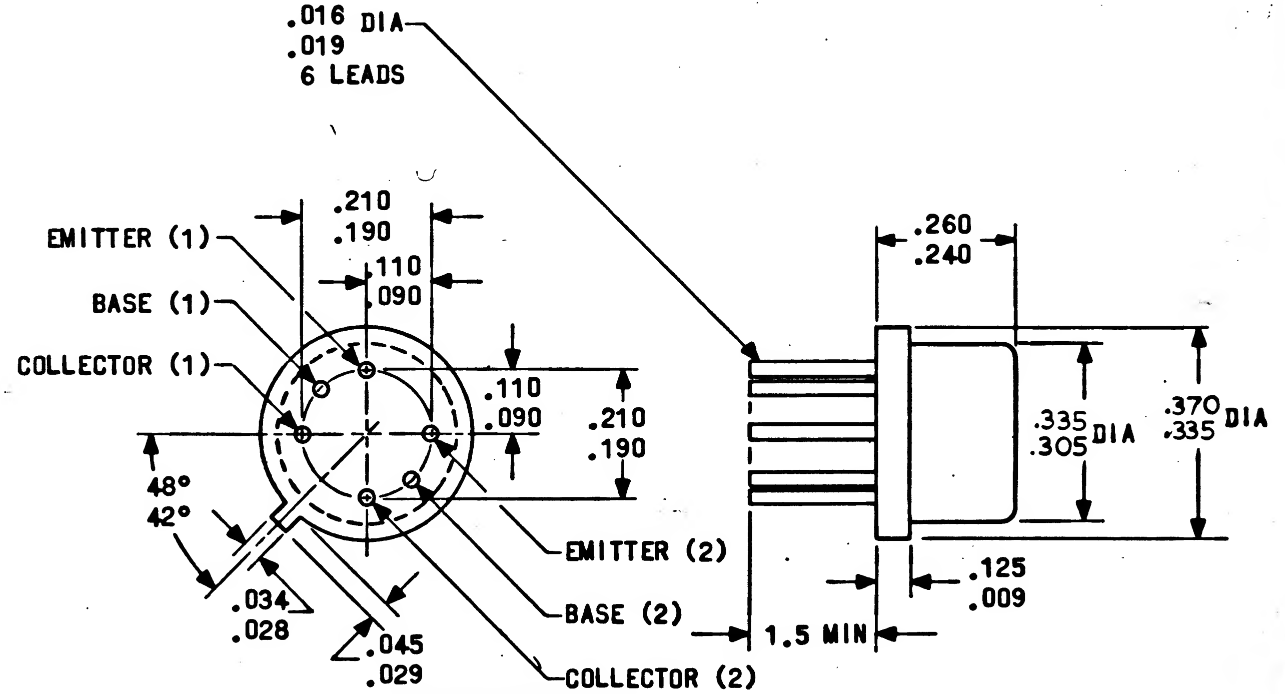

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LIST OF MATERIALS			

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DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

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CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	1010715
SCALE NONE	WT	SHEET 1 OF 4

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B	REVISED PER TDRR 22142	9/7/65	9/14
C	REVISED PER TDRR 23646	11/16/65	wk

REQUIREMENTS: (CONTINUED)

4. SPECIAL CONDITIONING BY SUPPLIER:

A. ALL UNITS SHALL HAVE SUCCESSFULLY PASSED THE FOLLOWING SCREENING TESTS PERFORMED DURING THE TIME INTERVAL BETWEEN FINAL SEAL AND THE 240-HOUR BURN-IN.

(1) ACCELERATION AT 20,000 G MINIMUM IN THE Y_1 ORIENTATION PER MIL-STD-750, METHOD 2006, OR IMPACT SHOCK AT 28K g MINIMUM IN THE Y_1 ORIENTATION.

(2) FINE LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION C, PROCEDURE III a OR b. A LEAK RATE OF 1×10^{-8} ATM CC/SEC OR GREATER SHALL CONSTITUTE A FAILURE.

(3) GROSS LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION A. GLYCERIN MAY BE USED IN LIEU OF MINERAL OIL.

B. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240-HOURS AT THE FOLLOWING CONDITIONS.

(1) AMBIENT TEMPERATURE: +25° ± 5°C.

(2) COLLECTOR VOLTAGE VCB: 20±1 VOLT PER SIDE.

(3) POWER DISSIPATION: 342 MILLIWATTS TOTAL (171 MILLIWATTS PER SIDE) (TJ=+125°C).

C. THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:

(1) SWITCHBACK VOLTAGE, LV_{CEO}

(2) COLLECTOR CUTOFF CURRENT, I_{CBO} AT $T_A=25°C$.

(3) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}{}^1$

(4) STATIC FORWARD CURRENT TRANSFER RATION hFE1

D. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN hFE OR HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} (THE ABSOLUTE INCREASE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.

T_{on} AND T_{off} TEST CIRCUIT

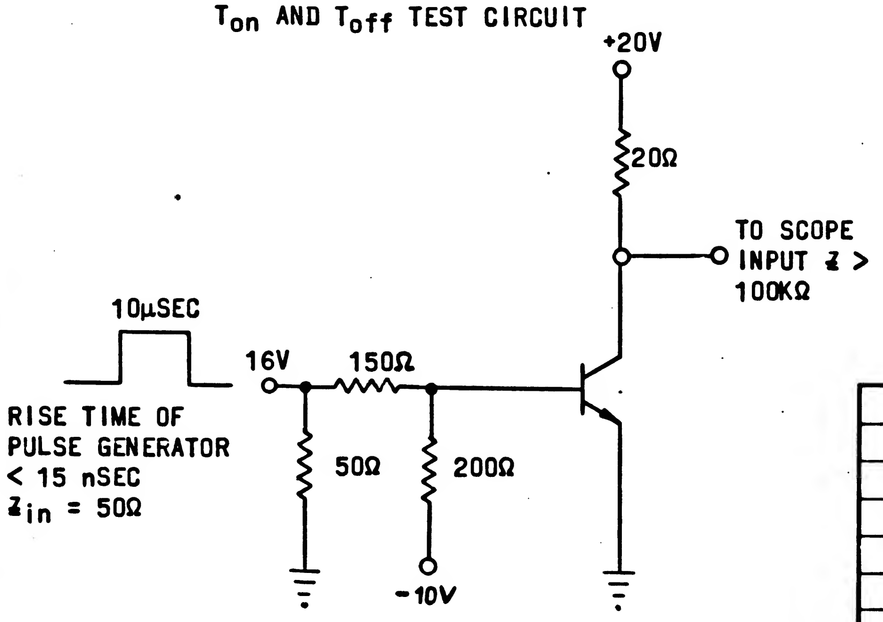

FIGURE 1

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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DWG. NO. Contract NAS 9-497
DRAWN Patterson DATE 30 JAN 64
CHECKED Ed Foster 3 FEB 64
APPROVAL 7 APR 64
APPROVAL
NASA APPROVAL 4/7/64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR, DUAL NPN,
SILICON

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	1010715
SCALE	WT	SHEET 2 OF 4

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1010715 C

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 07488	4/7/64	WR
A	REVISED PER TDRR 21423	8/31/65	WR
B	REVISED PER TDRR 22142	9/7/65	9/14
C	REVISED PER TDRR 23646	11/16/65	WR

TABLE 11

NASA DASH NO.	ELECTRICAL CHARACTERISTICS AT TC = +25°C (UNLESS OTHERWISE SPECIFIED)			SPECIFICATION LIMITS			
	PARAMETER	CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
-1	STATIC FORWARD CURRENT TRANSFER RATIO NOTE 1	I_C=1.0A, V_{CE}=2.0V	hFE1	50	80	150	
		I_C=2.0A, V_{CE}=5.0V	hFE2	40	75		
		I_C=100MA, V_{CE}=2.0V	hFE3	35	80		
	COLLECTOR SATURATION VOLTAGE NOTE 1	I_C=1.0A, I_B=0.1A	V_{CE}(SAT)1		0.2	0.57	VOLTS
		I_C=2.0A, I_B=0.2A	V_{CE}(SAT)2		0.35	0.90	VOLTS
	BASE SATURATION VOLTAGE NOTE 1	I_C=1.0A, I_B=0.1A	V_{BE}(SAT)1		1.0	1.23	VOLTS
		I_C=2.0A, I_B=0.2A	V_{BE}(SAT)2		1.1	1.37	VOLTS
	COLLECTOR CUTOFF CURRENT	I_E=0. V_{CB}=80V	I_{CBO}		5	15	NA
		I_E=0, V_{CB}=80V, T_C=+100°C	I_{CBO}		0.7	5.0	μA
		I_E=0, V_{CB}=80V, T_C=+150°C	I_{CBO}		5	20	μA
	COLLECTOR CUTOFF CURRENT	I_B=0, V_{CE}=60V	I_{CEO}		1.0	50	μA
	SMALL SIGNAL CURRENT GAIN	I_C=50MA, V_{CE}=10V, f=1KC	hfe	50	90		
	OUTPUT CAPACITANCE	I_E=0, V_{CB}=10V	C_{OB}		38	70	PF
	SWITCHBACK VOLTAGE NOTE 1	I_C=100MA, I_B=0	LV_{CEO}	80			VOLTS
	TURN ON TIME FIGURE 1	I_C=1.0A, $I_{B1} \approx$ 50MA	T_{ON}			0.3	μ SEC
	TURN OFF TIME FIGURE 1	I_C=1.0A, $I_{B1}=I_{B2} \approx$ 50MA	T_{OFF}			1.5	μ SEC
-2	COLLECTOR TO EMITTER VOLTAGE	I_C=100MA, I_B=0	LV_{CEO}	90			VOLTS
	COLLECTOR TO BASE VOLTAGE	I_C=100μA, I_E=0	BV_{CBO}	120			VOLTS
	EMITTER TO BASE VOLTAGE	I_E=100μA, I_C=0	BV_{EBO}	8.0			VOLTS
	COLLECTOR SATURATION VOLTAGE* NOTE 1	I_C=100MA, I_B=10MA	V_{CE}(SAT)			0.2	VOLTS
	COLLECTON SATURATION VOLTAGE* NOTE 1	I_C=2 AMP., I_B=200MA	V_{CE}(SAT)			0.8	VOLTS
	BASE SATURATION VOLTAGE* NOTE 1	I_C=100MA, I_B=10, MA	V_{BE} (SAT)			0.8	VOLTS
	BASE SATURATION VOLTAGE* NOTE 1	I_C=2 AMP., I_B=200MA	V_{BE} (SAT)			1.4	VOLTS
	DC CURRENT GAIN* NOTE 1	I_C=10MA, V_{CE}=2V	h_{FE1}	20			

TABLE 1

MAXIMUM RATINGS TC = +25°C

NASA DASH NO.	COLLECTOR VOLTAGE V_{CBO}	EMITTER VOLTAGE V_{EBO}	COLLECTOR VOLTAGE V_{CEO}	COLLECTOR POWER DISSIPATION
-1	V_{DC}	V_{DC}	V_{DC}	W
	120	5	100	3.0 (1.5 PER UNIT)
-2	120	8	100	3.0 (1.5 PER UNIT)

*NOTE 1 PULSED: LENGTH ≤ 300 μSEC; DUTY CYCLE ≤ 1%

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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SILICON
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	1010715
SCALE	WT	SHEET 3 OF 4

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS							
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REVISED PER TDRR 21423 (THIS SHEET ADDED)				WR	
B		REVISED PER TDRR 22142			9/7/65		9/14
C		REVISED PER TDRR 23646			11/16/65	WR	

TABLE II (CONTINUED)

NASA DASH NO.	ELECTRICAL CHARACTERISTICS AT TC = +25°C	(UNLESS OTHERWISE SPECIFIED)		SPECIFICATION LIMITS			
	PARAMETER	CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
-2	DC CURRENT GAIN* NOTE 1	I_C =100mA., V_{CE} =2V	h_{FE2}	60			
	DC CURRENT GAIN* NOTE 1	I_C=1 AMP., V_{CE}=2V	h_{FE5}	50			
	HIGH FREQUENCY CIRCUIT GAIN	I_C=200 MA, V_{CE}=10V	h_{FE}(20mc)	1.5			
	COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=80V	I_{CBO}			15	MUA
	COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=80V	I_{CBO}(150°C)			20	UA
	OUTPUT CAPACITANCE	I_E=0, V_{CB}=10V	C_{Ob}			45	pf
	OUTPUT CAPACITANCE DIFFERENCE		NOTE 2 $C_{OB1} - C_{OB2}$			15	pf
	TURN ON TIME FIGURE 2	I_C=100MA, I_B=5MA	T_{ON}			0.3	USEC
	TURN OFF TIME FIGURE 2	I_C=100MA, =20xI_B1	T_{OFF}			1.5	USEC
		20x1_{B2}					
	DC CURRENT GAIN RATIO	I_C=100 MA, V_{CE}= 2V	$h_{FE1} - h_{FE2}$ NOTE 2	0.8		1.0	
	V_{CE} SATURATION VOLTAGE DIFFERENCE	I_B=5MA I_C=100MA	$V_{CE1} - V_{CE2}$ NOTE 2			50	MV

NOTE 2: FOR DIFFERENCE OR RATIO TESTS, PARAMETER #1 IS DEFINED AS THE HIGHER NUMERICAL VALUE.

T ON AND T OFF TEST CIRCUIT

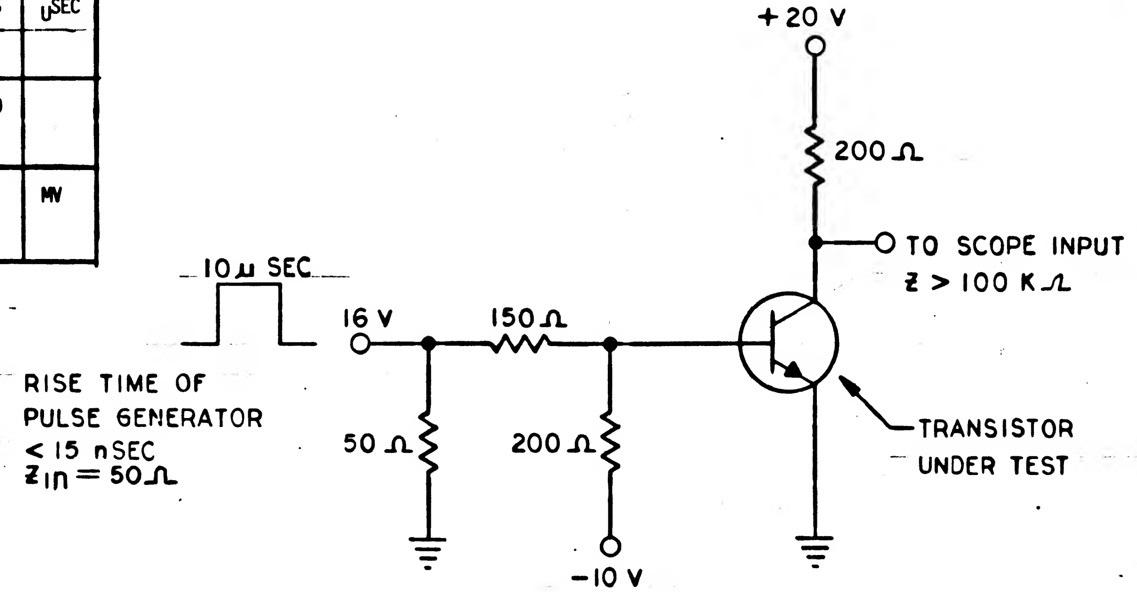


FIGURE 2

Ⓐ THIS SHEET ADDED

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Aug 27 65
CHECKED Aug 27 65
APPROVED Aug 27 65
APPROVED
APPROVED MIT 31 Aug 65
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR DUAL NPN
SILICON
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
DRAWING NO. 1010715
SCALE —
SHEET 4 OF 4

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 07488	4/7/64	WK
A	REVISED PER TDRR 21423	8/31/65	wK.
B	REVISED PER TDRR 22142	9/7/65	9/14
C	REVISED PER TDRR 23646	11/16/65	WK
D	REVISED PER TDRR 29482	10 JUN 66	PHG

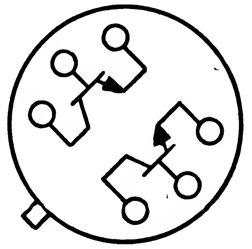
REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. THE SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - C. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002051 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - D. PACKAGING AND PACKING: UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH ND1002215, CLASS I, CODE 2

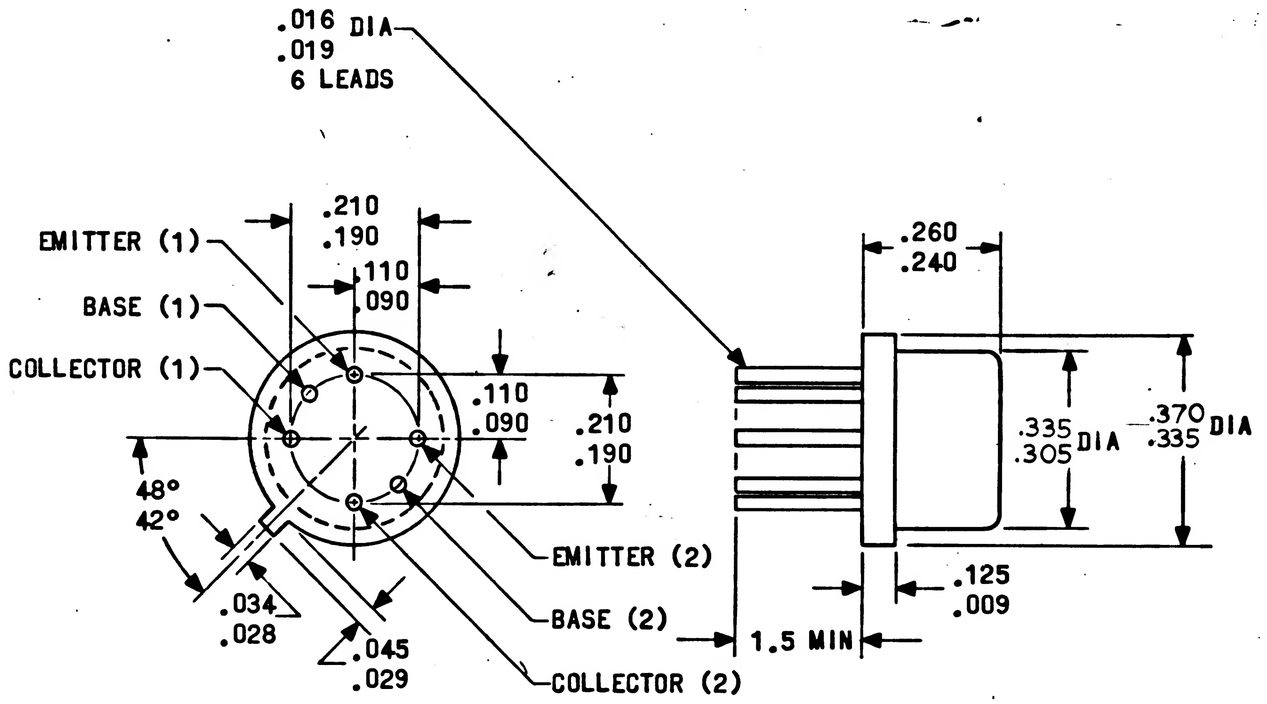
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MARKING: THE NASA DRAWING NUMBER (WHICH SHALL CONSIST OF AT LEAST THE LAST THREE DIGITS) AND THE MANUFACTURER'S NAME, TRADEMARK, OR CODE, DATE CODE, AND THE SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND1002019
     - (2) LEAD DATA: KOVAR, GOLD PLATED PER ND 1015402. A CERTIFICATE OF COMPLIANCE FOR THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
   - B. ELECTRICAL REQUIREMENTS: PER TABLE II.
     - (1) COLLECTOR CUTOFF CURRENT I_{CBO} AT 25°C AND 100°C
     - (2) SWITCHBACK VOLTAGE, LV_{CEO}
     - (3) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}, h_{FE2}, h_{FE3}
     - (4) BASE SATURATION VOLTAGE, $V_{BE(SAT)}$
     - (5) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$

3. DESIGN REQUIREMENTS:
   - A. JUNCTION TEMPERATURE: -65°C TO +200°C.
   - B. ELECTRICAL RATING: PER TABLE I.
   - C. ELECTRICAL SPECIFICATION: PER TABLE II.
   - D. POWER DISSIPATION (EACH SIDE):
     - (1) AT 25°C AMBIENT TEMPERATURE: 500 MILLIWATTS MAXIMUM.
       - (a) DERATING: 350°C/WATT
     - (2) AT 25°C CASE TEMPERATURE: 1.5 WATTS MAXIMUM.
       - (a) DERATING: 117°C/WATT
   - E. POWER DISSIPATION (DUAL DEVICE):
     - (1) AT 25°C AMBIENT TEMPERATURE: 600 MILLIWATTS MAXIMUM.
       - (a) DERATING: 292°C/WATT.
     - (2) AT 25° CASE TEMPERATURE: 3.0 WATTS MAXIMUM.
       - (a) DERATING: 58.3°C/WATT.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



GRAPHICAL SYMBOL



MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497

DRAWN Patterson DATE 30 JAN 64
CHECKED Ed Foster 3 FEB 64
APPROVAL D. R. Test 7 APR 64
APPROVAL
NASA APPROVAL 4/7/64
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HOUSTON, TEXAS

TRANSISTOR, DUAL, NPN,
SILICON

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010715
SCALE NONE
WT
SHEET 1 OF 4

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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 07488	4/7/64	wk
A	REVISIED PER TDRR 21423	8/3/65	wk
B	REVISED PER TDRR 22142	9/7/65	9/14
C	REVISED PER TDRR 23646	11/16/65	wk
D	REVISED PER TDRR 29482	10 JUN 66	PHG.

REQUIREMENTS: (CONTINUED)

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. ALL UNITS SHALL HAVE SUCCESSFULLY PASSED THE FOLLOWING SCREENING TESTS PERFORMED DURING THE TIME INTERVAL BETWEEN FINAL SEAL AND THE 240 HOUR BURN-IN.
     - (1) ACCELERATION AT 20,000 G MINIMUM IN THE Y_1 ORIENTATION PER MIL-STD-750, METHOD 2006, OR IMPACT SHOCK AT 28K g MINIMUM IN THE Y_1 ORIENTATION.
     - (2) FINE LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION C, PROCEDURE III a OR b. A LEAK RATE OF 1 X 10^{-8} ATM CC/SEC OR GREATER SHALL CONSTITUTE A FAILURE.
     - (3) GROSS LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION A. GLYCERIN MAY BE USED IN LIEU OF MINERAL OIL.
     - (4) FOLLOWING THE ABOVE AND PRIOR TO BURN-IN, THE MANUFACTURER SHALL PERFORM:
       - (a) DETERMINE COLLECTOR CUTOFF CURRENT, I_{CBO} AT +25°C (LIMIT: 15 nA MAX).
       - (b) VOLTAGE TEMPERATURE STRESS: UNITS SHALL BE STRESSED FOR 100 HOURS AT THE FOLLOWING CONDITIONS:
         - 1. AMBIENT TEMPERATURE: +150 ± 5°C.
         - 2. COLLECTOR VOLTAGE V_{CBO}: 90 ± 2 VOLTS PER SIDE
         - 3. UPON COMPLETION OF THE 100 HOUR STRESS, UNITS SHALL REMAIN ENERGIZED, AT THE SPECIFIED V_{CBO}, UNTIL THE AMBIENT TEMPERATURE HAS DECREASED TO +25°C AT A RATE OF 15 MIN. $\leq t \leq$ 30 MIN.
       - (c) DETERMINE COLLECTOR CUTOFF CURRENT, I_{CBO} AT +25°C, WITHIN 4 HOURS OF COMPLETION OF VOLTAGE TEMPERATURE STRESS (LIMIT: 15 nA MAX).
   - B. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS.
     - (1) AMBIENT TEMPERATURE: +25° ±5°C.
     - (2) COLLECTOR VOLTAGE VCB: 60 ± 1 VOLT PER SIDE.
     - (3) POWER DISSIPATION: 342 MILLIWATTS TOTAL (171 MILLIWATTS PER SIDE) (TJ = +125°C).
   - C. THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
     - (1) SWITCHBACK VOLTAGE, LV_{CEO}
     - (2) COLLECTOR CUTOFF CURRENT, I_{CBO} AT T_A = 25°C.
       NOTE: MEASUREMENT FOLLOWING BURN-IN SHALL BE MADE WITHIN 4 HOURS.
     - (3) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}{}^1$
     - (4) STATIC FORWARD CURRENT TRANSFER RATION hFE1
   - D. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING. THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN hFE OR HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} (THE ABSOLUTE INCREASE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.

T_{on} AND T_{off} TEST CIRCUIT

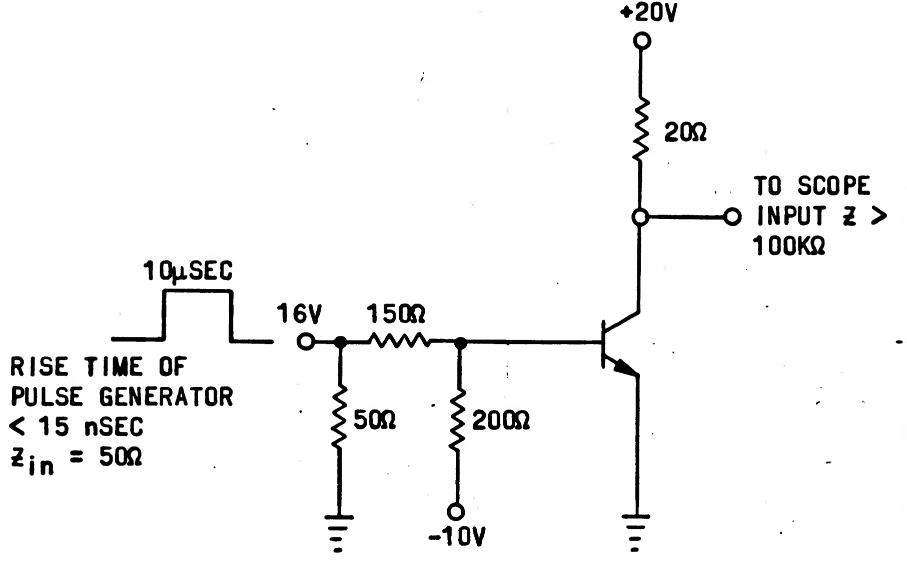

FIGURE 1

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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TRANSISTOR, DUAL NPN,
SILICON

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	1010715
SCALE	WT	SHEET 2 OF 4

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1010715	D

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
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B	REVISED PER TDRR 22142	9/7/65	9/14
C	REVISED PER TDRR 23646	11/16/65	WR
D	REVISED PER TDRR 29482	6-14-66	

TABLE 11

NASA DASH NO.	ELECTRICAL CHARACTERISTICS AT TC = +25°C (UNLESS OTHERWISE SPECIFIED)			SPECIFICATION LIMITS			
	PARAMETER	CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
-1	STATIC FORWARD CURRENT TRANSFER RATIO NOTE 1	I_C=1.0A, V_{CE}=2.0V	hFE1	50	80	150	
		I_C=2.0A, V_{CE}=5.0V	hFE2	40	75		
		I_C=100MA, V_{CE}=2.0V	hFE3	35	80		
	COLLECTOR SATURATION VOLTAGE NOTE 1	I_C=1.0A, I_B=0.1A	V_{CE}(SAT)1		0.2	0.57	VOLTS
		I_C=2.0A, I_B=0.2A	V_{CE}(SAT)2		0.35	0.90	VOLTS
	BASE SATURATION VOLTAGE NOTE 1	I_C=1.0A, I_B=0.1A	V_{BE}(SAT)1		1.0	1.23	VOLTS
		I_C=2.0A, I_B=0.2A	V_{BE}(SAT)2		1.1	1.37	VOLTS
	COLLECTOR CUTOFF CURRENT	I_E=0. V_{CB}=80V	I_{CBO}		5	15	NA
		I_E=0, V_{CB}=80V, T_C=+100°C	I_{CBO}		0.7	5.0	μA
		I_E=0, V_{CB}=80V, T_C=+150°C	I_{CBO}		5	20	μA
	COLLECTOR CUTOFF CURRENT	I_B=0, V_{CE}=60V	I_{CEO}		1.0	50	μA
	SMALL SIGNAL CURRENT GAIN	I_C=50MA, V_{CE}=10V, f=1KC	hfe	50	90		
	OUTPUT CAPACITANCE	I_E=0, V_{CB}=10V	C_{OB}		38	70	PF
	SWITCHBACK VOLTAGE NOTE 1	I_C=100MA, I_B=0	LV_{CEO}	80			VOLTS
	TURN ON TIME FIGURE 1	I_C=1.0A, $I_{B1} \approx$ 50MA	T_{ON}			0.3	μ SEC
	TURN OFF TIME FIGURE 1	I_C=1.0A, $I_{B1}=I_{B2} \approx$ 50MA	T_{OFF}			1.5	μ SEC
-2	COLLECTOR TO EMITTER VOLTAGE	I_C=100MA, I_B=0	LV_{CEO}	90			VOLTS
	COLLECTOR TO BASE VOLTAGE	I_C=100μA, I_E=0	BV_{CBO}	120			VOLTS
	EMITTER TO BASE VOLTAGE	I_E=100μA, I_C=0	BV_{EBO}	8.0			VOLTS
	COLLECTOR SATURATION VOLTAGE* NOTE 1	I_C=100MA, I_B=10MA	V_{CE}(SAT)			0.2	VOLTS
	COLLECTON SATURATION VOLTAGE* NOTE 1	I_C=2 AMP., I_B=200MA	V_{CE}(SAT)			0.8	VOLTS
	BASE SATURATION VOLTAGE* NOTE 1	I_C=100MA, I_B=10, MA	V_{BE} (SAT)			0.8	VOLTS
	BASE SATURATION VOLTAGE* NOTE 1	I_C=2 AMP., I_B=200MA	V_{BE} (SAT)			1.4	VOLTS
	DC CURRENT GAIN* NOTE 1	I_C=10MA, V_{CE}=2V	h_{FE1}	20			

TABLE 1

MAXIMUM RATINGS TC = +25°C

NASA DASH NO.	COLLECTOR VOLTAGE V_{CBO}	EMITTER VOLTAGE V_{EBO}	COLLECTOR VOLTAGE V_{CEO}	COLLECTOR POWER DISSIPATION
-1	V_{DC}	V_{DC}	V_{DC}	W
	120	5	100	3.0 (1.5 PER UNIT)
-2	120	8	100	3.0 (1.5 PER UNIT)

*NOTE 1 PULSED: LENGTH ≤ 300 μSEC; DUTY CYCLE ≤ 1%

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
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DWG. NO. Contract NAS 9-497

DRAWN Patterson DATE 30 JAN 64
CHECKED Ed Foster 3 FEB 64
APPROVAL D.R. Test 7 APR 64
APPROVAL
NASA APPROVAL 4/7/64
MIT APPROVAL

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TRANSISTOR, DUAL, NPN,
SILICON
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	1010715
SCALE	WT	SHEET 3 OF 4

MASTER

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REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REVISED PER TDRR 21423 (THIS SHEET ADDED)				WR	
B		REVISED PER TDRR 22142			9/7/65		9/14
C		REVISED PER TDRR 23646			11/16/65	WR	
D		REVISIED PER TDRR 29482			6-14-66		

TABLE II (CONTINUED)

NASA DASH NO.	ELECTRICAL CHARACTERISTICS AT TC = +25°C	(UNLESS OTHERWISE SPECIFIED)		SPECIFICATION LIMITS			
	PARAMETER	CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
-2	DC CURRENT GAIN* NOTE 1	I_C =100mA., V_{CE} =2V	h_{FE2}	60			
	DC CURRENT GAIN* NOTE 1	I_C=1 AMP., V_{CE}=2V	h_{FE5}	50			
	HIGH FREQUENCY CIRCUIT GAIN	I_C=200 MA, V_{CE}=10V	h_{FE}(20mc)	1.5			
	COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=80V	I_{CBO}			15	MUA
	COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=80V	I_{CBO}(150°C)			20	UA
	OUTPUT CAPACITANCE	I_E=0, V_{CB}=10V	C_{Ob}			45	pf
	OUTPUT CAPACITANCE DIFFERENCE		NOTE 2 C_{OB1} - C_{OB2}			15	pf
	TURN ON TIME FIGURE 2	I_C=100MA, I_B=5MA	T_{ON}			0.3	USEC
	TURN OFF TIME FIGURE 2	I_C=100MA, =20xI_B1	T_{OFF}			1.5	USEC
		20x1_{B2}					
	DC CURRENT GAIN RATIO	I_C=100 MA, V_{CE}= 2V	h_{FE1} - h_{FE2} NOTE 2	0.8		1.0	
	V_{CE} SATURATION VOLTAGE DIFFERENCE	I_B=5MA I_C=100MA	V_{CE1} - V_{CE2} NOTE 2			50	MV

NOTE 2: FOR DIFFERENCE OR RATIO TESTS, PARAMETER #1 IS DEFINED AS THE HIGHER NUMERICAL VALUE.

T ON AND T OFF TEST CIRCUIT

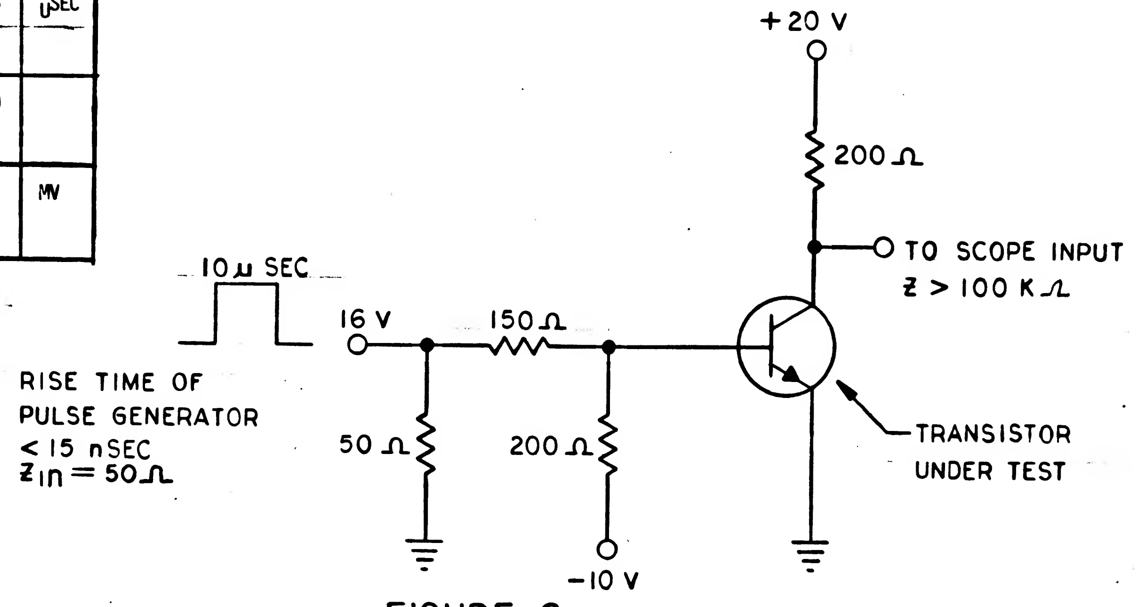

FIGURE 2

Ⓐ THIS SHEET ADDED

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
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MATERIAL

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DRAWN Louis A Lar Aug 22, 65
CHECKED Aug 22 65
APPROVED Aug 27 65
APPROVED
APPROVED MIT W Kupfer 31 Aug 65
APPROVED MSC A. C. METZGER
DATE

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TRANSISTOR DUAL NPN
SILICON
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	DRAWING NO.
80230	C	1010715

SCALE ——
SHEET 4 OF 4

MASTER

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1010715 E

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 07488	4/7/64	wll
A	REVISED PER TDRR 21423	8/31/65	wK.
B	REVISED PER TDRR 22142	9/7/65	9/14
C	REVISED PER TDRR 23646	11/16/65	wll
D	REVISED PER TDRR 29482	10 JUN 66	PHG
E	REVISED PER TDRR 29483	6/23/66	MGM

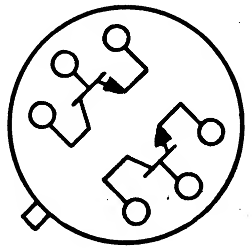
REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. THE SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - C. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002051 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - D. PACKAGING AND PACKING: UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH ND1002215, CLASS I, CODE 2

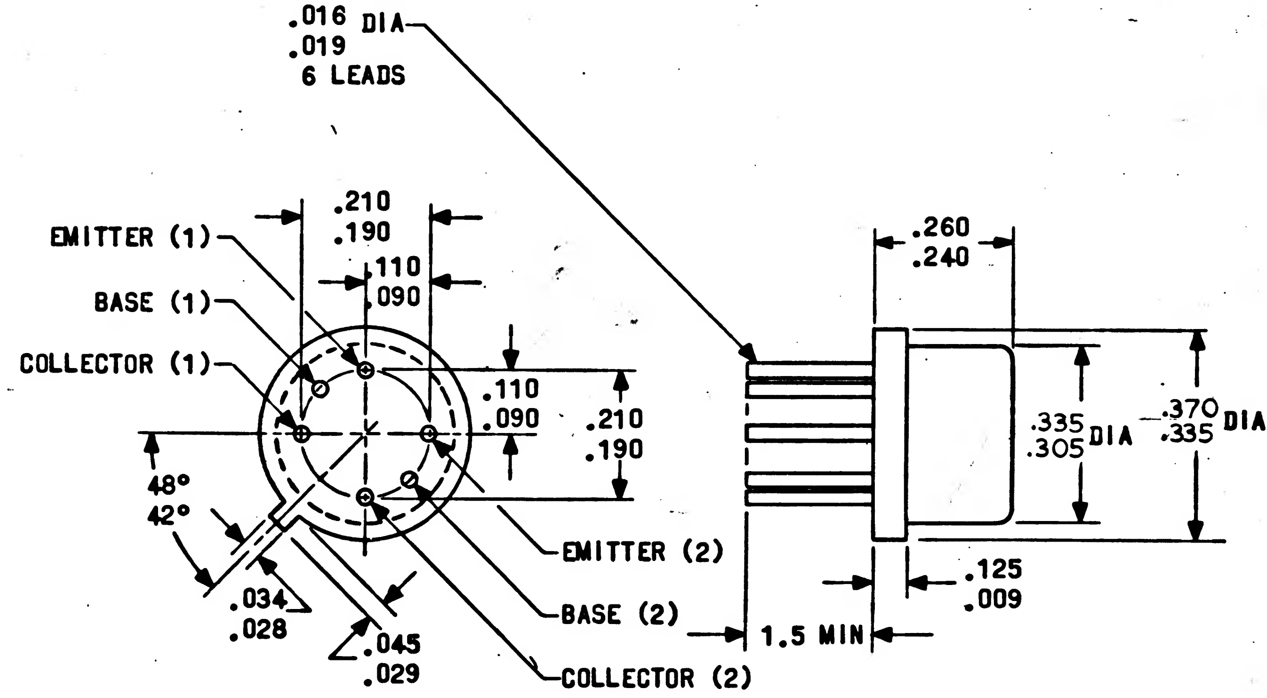
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MARKING: THE NASA DRAWING NUMBER (WHICH SHALL CONSIST OF AT LEAST THE LAST THREE DIGITS) AND THE MANUFACTURER'S NAME, TRADEMARK, OR CODE, DATE CODE, AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND1002019
     - (2) LEAD DATA: KOVAR, GOLD PLATED PER ND 1015402. A CERTIFICATE OF COMPLIANCE FOR THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
   - B. ELECTRICAL REQUIREMENTS: PER TABLE II.
     - (1) COLLECTOR CUTOFF CURRENT I_{CBO} AT 25°C AND 100°C
     - (2) SWITCHBACK VOLTAGE, LV_{CEO}
     - (3) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}, h_{FE2}, h_{FE3}
     - (4) BASE SATURATION VOLTAGE, $V_{BE(SAT)}$
     - (5) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$

3. DESIGN REQUIREMENTS:
   - A. JUNCTION TEMPERATURE: -65°C TO +200°C.
   - B. ELECTRICAL RATING: PER TABLE I.
   - C. ELECTRICAL SPECIFICATION: PER TABLE II.
   - D. POWER DISSIPATION (EACH SIDE):
     - (1) AT 25°C AMBIENT TEMPERATURE: 500 MILLIWATTS MAXIMUM.
       - (a) DERATING: 350°C/WATT
     - (2) AT 25°C CASE TEMPERATURE: 1.5 WATTS MAXIMUM.
       - (a) DERATING: 117°C/WATT
   - E. POWER DISSIPATION (DUAL DEVICE):
     - (1) AT 25°C AMBIENT TEMPERATURE: 600 MILLIWATTS MAXIMUM.
       - (a) DERATING: 292°C/WATT.
     - (2) AT 25° CASE TEMPERATURE: 3.0 WATTS MAXIMUM.
       - (a) DERATING: 58.3°C/WATT.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



GRAPHICAL SYMBOL



MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
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DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

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Contract NAS 9-497
DRAWN [illegible] DATE 30 JAN 64
CHECKED Ed Foster 3 FEB 64
APPROVAL D. R. [illegible] 7 APR 64
APPROVAL
NASA APPROVAL [illegible] 4/7/64
MIT APPROVAL [illegible] 7 Apr 64

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010715
SCALE NONE
WT
SHEET 1 OF 4

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REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 07488	4/7/64	wk
A	REVISIED PER TDRR 21423	8/3/65	wk
B	REVISED PER TDRR 22142	9/7/65	9/14
C	REVISED PER TDRR 23646	11/16/65	wk
D	REVISED PER TDRR 29482	10 JUN 66	PHG
E	REVISED PER TDR R 29483	6/23/66	mlm

REQUIREMENTS: (CONTINUED)

4. SPECIAL CONDITIONING BY SUPPLIER:
   A. ALL UNITS SHALL HAVE SUCCESSFULLY PASSED THE FOLLOWING SCREENING TESTS PERFORMED DURING THE TIME INTERVAL BETWEEN FINAL SEAL AND THE 240 HOUR BURN-IN.
      (1) ACCELERATION AT 20,000 G MINIMUM IN THE Y_1 ORIENTATION PER MIL-STD-750, METHOD 2006, OR IMPACT SHOCK AT 28K g MINIMUM IN THE Y_1 ORIENTATION.
      (2) FINE LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION C, PROCEDURE III a OR b. A LEAK RATE OF 1×10^{-8} ATM CC/SEC OR GREATER SHALL CONSTITUTE A FAILURE.
      (3) GROSS LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION A. GLYCERIN MAY BE USED IN LIEU OF MINERAL OIL.
      (4) FOLLOWING THE ABOVE AND PRIOR TO BURN-IN, THE MANUFACTURER SHALL PERFORM:
         (a) DETERMINE COLLECTOR CUTOFF CURRENT, I_{CBO} AT +25°C (LIMIT: 15 nA MAX).
         (b) VOLTAGE TEMPERATURE STRESS: UNITS SHALL BE STRESSED FOR 100 HOURS AT THE FOLLOWING CONDITIONS:
            1. AMBIENT TEMPERATURE: +150 ± 5°C.
            2. COLLECTOR VOLTAGE V_{CBO}: 90 ± 2 VOLTS PER SIDE
            3. UPON COMPLETION OF THE 100 HOUR STRESS, UNITS SHALL REMAIN ENERGIZED, AT THE SPECIFIED V_{CBO}, UNTIL THE AMBIENT TEMPERATURE HAS DECREASED TO +25°C AT A RATE OF 15 MIN. $\leq t \leq$ 30 MIN.
         (c) DETERMINE COLLECTOR CUTOFF CURRENT, I_{CBO} AT +25°C, WITHIN 4 HOURS OF COMPLETION OF VOLTAGE TEMPERATURE STRESS (LIMIT: 15 nA MAX).
   B. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS.
      (1) AMBIENT TEMPERATURE: +25° ±5°C.
      (2) COLLECTOR VOLTAGE VCB: 60 ± 1 VOLT PER SIDE.
      (3) POWER DISSIPATION: 342 MILLIWATTS TOTAL (171 MILLIWATTS PER SIDE) (TJ = +125°C).
   C. THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
      (1) SWITCHBACK VOLTAGE, LV_{CEO}
      (2) COLLECTOR CUTOFF CURRENT, I_{CBO} AT T_A = 25°C.
      NOTE: MEASUREMENT FOLLOWING BURN-IN SHALL BE MADE WITHIN 4 HOURS.
      (3) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}{}^1$
      (4) STATIC FORWARD CURRENT TRANSFER RATION hFE1
   D. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING. THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN hFE OR HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} (THE ABSOLUTE INCREASE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.

T_{on} AND T_{off} TEST CIRCUIT

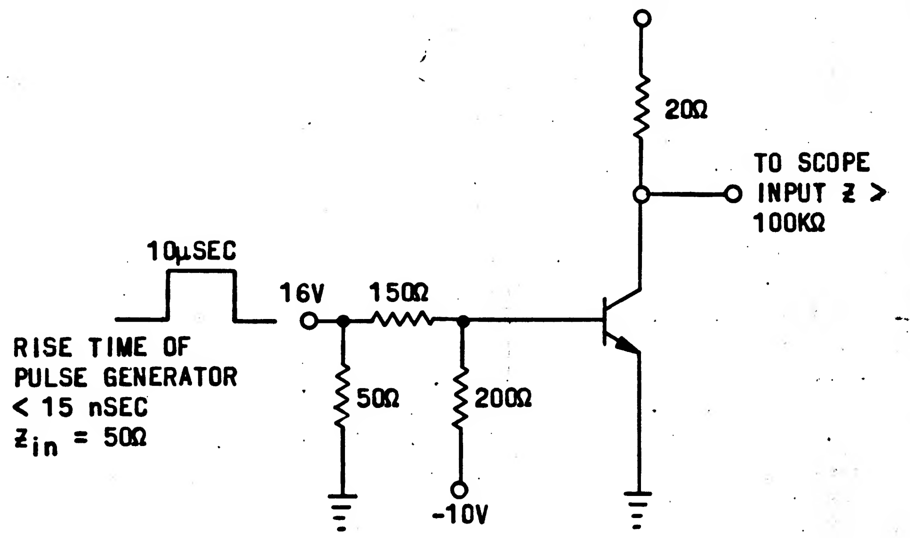

FIGURE 1

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
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SILICON

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010715
SCALE
WT
SHEET 2 OF 4

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1010715 E

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 07488	4/7/64	WR
A	REVISED PER TDRR 21423	8/31/65	WR
B	REVISED PER TDRR 22142	9/7/65	9/14
C	REVISED PER TDRR 23646	11/16/65	WR
D	REVISED PER TDRR 29482	6-14-66	
E	REVISED PER TDRR 29483	6/23/66	

TABLE 11

NASA DASH NO.	ELECTRICAL CHARACTERISTICS AT TC = +25°C (UNLESS OTHERWISE SPECIFIED)			SPECIFICATION LIMITS			
	PARAMETER	CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
-1	STATIC FORWARD CURRENT TRANSFER RATIO NOTE 1	I_C=1.0A, V_{CE}=2.0V	hFE1	50	80	150	
		I_C=2.0A, V_{CE}=5.0V	hFE2	40	75		
		I_C=100MA, V_{CE}=2.0V	hFE3	35	80		
	COLLECTOR SATURATION VOLTAGE NOTE 1	I_C=1.0A, I_B=0.1A	V_{CE}(SAT)1		0.2	0.57	VOLTS
		I_C=2.0A, I_B=0.2A	V_{CE}(SAT)2		0.35	0.90	VOLTS
	BASE SATURATION VOLTAGE NOTE 1	I_C=1.0A, I_B=0.1A	V_{BE}(SAT)1		1.0	1.23	VOLTS
		I_C=2.0A, I_B=0.2A	V_{BE}(SAT)2		1.1	1.37	VOLTS
	COLLECTOR CUTOFF CURRENT	I_E=0. V_{CB}=80V	I_{CBO}		5	15	NA
		I_E=0, V_{CB}=80V, T_C=+100°C	I_{CBO}		0.7	5.0	μA
		I_E=0, V_{CB}=80V, T_C=+150°C	I_{CBO}		5	20	μA
	COLLECTOR CUTOFF CURRENT	I_B=0, V_{CE}=60V	I_{CEO}		1.0	50	μA
	SMALL SIGNAL CURRENT GAIN	I_C=50MA, V_{CE}=10V, f=1KC	hfe	50	90		
	OUTPUT CAPACITANCE	I_E=0, V_{CB}=10V	C_{OB}		38	70	PF
	SWITCHBACK VOLTAGE NOTE 1	I_C=100MA, I_B=0	LV_{CEO}	80			VOLTS
	TURN ON TIME FIGURE 1	I_C=1.0A, $I_{B1} \approx$ 50MA	T_{ON}			0.3	μ SEC
	TURN OFF TIME FIGURE 1	I_C=1.0A, $I_{B1}=I_{B2} \approx$ 50MA	T_{OFF}			1.5	μ SEC
-2	COLLECTOR TO EMITTER VOLTAGE	I_C=100MA, I_B=0	LV_{CEO}	90			VOLTS
	COLLECTOR TO BASE VOLTAGE	I_C=100μA, I_E=0	BV_{CBO}	120			VOLTS
	EMITTER TO BASE VOLTAGE	I_E=100μA, I_C=0	BV_{EBO}	8.0			VOLTS
	COLLECTOR SATURATION VOLTAGE* NOTE 1	I_C=100MA, I_B=10MA	V_{CE}(SAT)			0.2	VOLTS
	COLLECTON SATURATION VOLTAGE* NOTE 1	I_C=2 AMP., I_B=200MA	V_{CE}(SAT)			0.8	VOLTS
	BASE SATURATION VOLTAGE* NOTE 1	I_C=100MA, I_B=10, MA	V_{BE} (SAT)			0.8	VOLTS
	BASE SATURATION VOLTAGE* NOTE 1	I_C=2 AMP., I_B=200MA	V_{BE} (SAT)			1.4	VOLTS
	DC CURRENT GAIN* NOTE 1	I_C=10MA, V_{CE}=2V	h_{FE1}	20			

TABLE 1

MAXIMUM RATINGS TC = +25°C

NASA DASH NO.	COLLECTOR VOLTAGE V_{CBO}	EMITTER VOLTAGE V_{EBO}	COLLECTOR VOLTAGE V_{CEO}	COLLECTOR POWER DISSIPATION
-1	V_{DC}	V_{DC}	V_{DC}	W
	120	5	100	3.0 (1.5 PER UNIT)
-2	120	8	100	3.0 (1.5 PER UNIT)

*NOTE 1 PULSED: LENGTH ≤ 300 μSEC; DUTY CYCLE ≤ 1%

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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DO NOT SCALE THIS DRAWING
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DRAWN Patterson DATE 30 JAN 64
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TRANSISTOR, DUAL, NPN,
SILICON
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010715
SCALE
WT
SHEET 3 OF 4

MASTER

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS							
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REVISED PER TDRR 21423 (THIS SHEET ADDED)				WR	
B		REVISED PER TDRR 22142			9/7/65		9/14
C		REVISED PER TDRR 23646			11/16/65	WR	
D		REVISIED PER TDRR 29482			6-14-66		
E		REVISED PER TDRR 29483			6/23/66		

TABLE II (CONTINUED)

NASA DASH NO.	ELECTRICAL CHARACTERISTICS AT TC = +25°C	(UNLESS OTHERWISE SPECIFIED)		SPECIFICATION LIMITS			
	PARAMETER	CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
-2	DC CURRENT GAIN* NOTE 1	I_C =100mA., V_{CE} =2V	h_{FE2}	80			
	DC CURRENT GAIN* NOTE 1	I_C=1 AMP., V_{CE}=2V	h_{FE5}	50			
	HIGH FREQUENCY CIRCUIT GAIN	I_C=200 MA, V_{CE}=10V	h_{FE}(20mc)	1.5			
	COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=80V	I_{CBO}			15	μA
	COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=80V	I_{CBO}(150°C)			20	uA
	OUTPUT CAPACITANCE	I_E=0, V_{CB}=10V	C_{Ob}			45	pf
	OUTPUT CAPACITANCE DIFFERENCE		NOTE 2 C_{OB1} - C_{OB2}			15	pf
	TURN ON TIME FIGURE 2	I_C=100MA, I_B=5MA	T_{ON}			0.3	uSEC
	TURN OFF TIME FIGURE 2	I_C=100MA, =20xI_{B1}	T_{OFF}			1.5	uSEC
		20x1_{B2}					
	DC CURRENT GAIN RATIO	I_C=100 MA, V_{CE}=2V	h_{FE1} - h_{FE2} NOTE 2	0.8		1.0	
	V_{CE} SATURATION VOLTAGE DIFFERENCE	I_B=5MA I_C=100MA	V_{CE1} - V_{CE2} NOTE 2			50	MV

NOTE 2: FOR DIFFERENCE OR RATIO TESTS, PARAMETER #1 IS DEFINED AS THE HIGHER NUMERICAL VALUE.

T ON AND T OFF TEST CIRCUIT

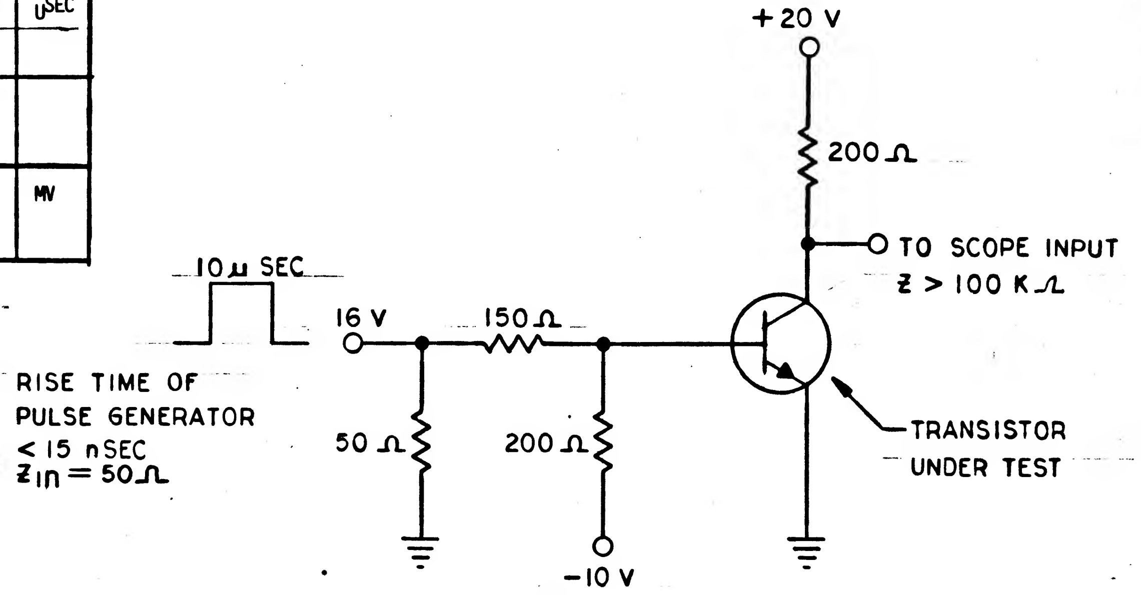


FIGURE 2

Ⓐ THIS SHEET ADDED

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	Louis S Lowe	Aug 27,65
CHECKED		Aug 27 65
APPROVED		Aug 27 65
APPROVED		
APPROVED MIT	W Kupfer	31 Aug 65
APPROVED MSC	A. C. METZGER	
		DATE

TRANSISTOR DUAL NPN
SILICON
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	DRAWING NO.
80230	C	1010715
SCALE ——		SHEET 4 OF 4

MASTER

1010715 F

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 07488	4/7/64	wll
A	REVISED PER TDRR 21423	8/31/65	wK.
B	REVISED PER TDRR 22142	9/7/65	9/14
C	REVISED PER TDRR 23646	11/16/65	wll
D	REVISED PER TDRR 29482	10 JUN 66	PHG
E	REVISED PER TDRR 29483	6/23/66	MGM
F	REVISION STATUS CHANGED	26 AUG 66	JJB

REQUIREMENTS:

1. GENERAL:
   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

   B. THE SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   C. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002051 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   D. PACKAGING AND PACKING: UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH ND1002215, CLASS I, CODE 2

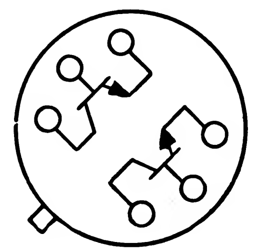
2. INSPECTION AND ACCEPTANCE:
   A. MECHANICAL REQUIREMENTS:
      (1) MARKING: THE NASA DRAWING NUMBER (WHICH SHALL CONSIST OF AT LEAST THE LAST THREE DIGITS) AND THE MANUFACTURER'S NAME, TRADEMARK, OR CODE, DATE CODE, AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND1002019

      (2) LEAD DATA: KOVAR, GOLD PLATED PER ND 1015402. A CERTIFICATE OF COMPLIANCE FOR THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.

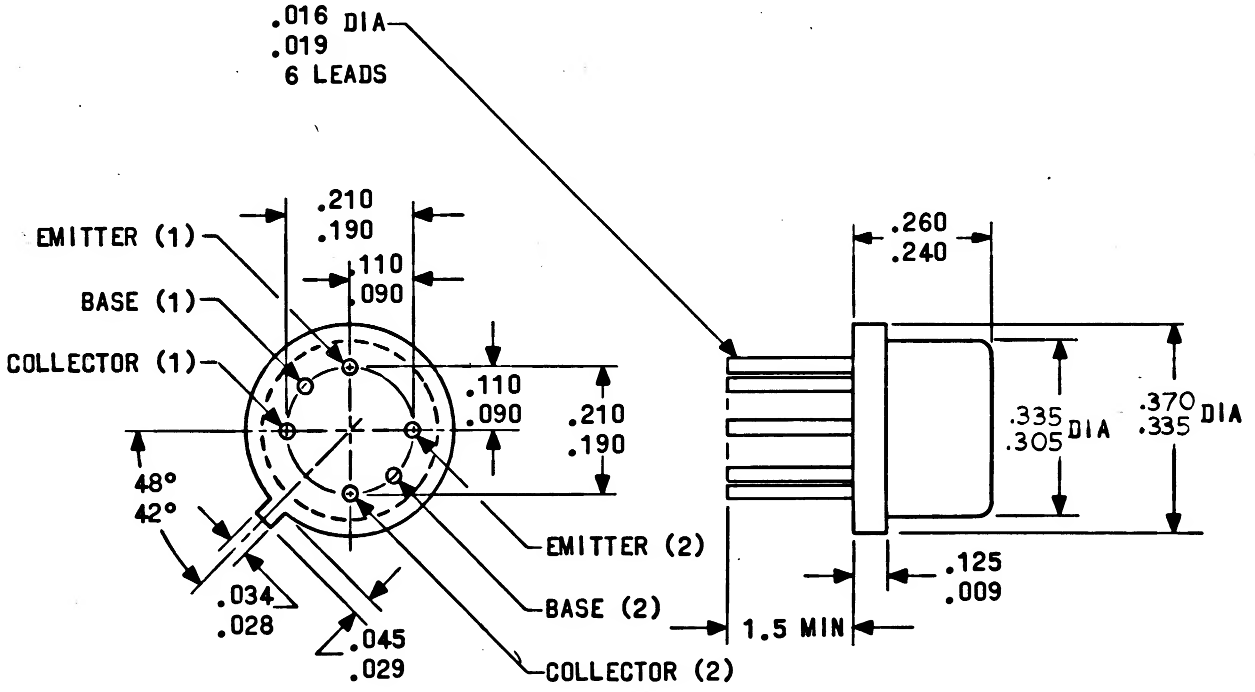
   B. ELECTRICAL REQUIREMENTS: PER TABLE II.
      (1) COLLECTOR CUTOFF CURRENT I_{CBO} AT 25°C AND 100°C
      (2) SWITCHBACK VOLTAGE, LV_{CEO}
      (3) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}, h_{FE2}, h_{FE3}
      (4) BASE SATURATION VOLTAGE, $V_{BE(SAT)}$
      (5) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$

3. DESIGN REQUIREMENTS:
   A. JUNCTION TEMPERATURE: -65°C TO +200°C.
   B. ELECTRICAL RATING: PER TABLE I.
   C. ELECTRICAL SPECIFICATION: PER TABLE II.
   D. POWER DISSIPATION (EACH SIDE):
      (1) AT 25°C AMBIENT TEMPERATURE: 500 MILLIWATTS MAXIMUM.
         (a) DERATING: 350°C/WATT
      (2) AT 25°C CASE TEMPERATURE: 1.5 WATTS MAXIMUM.
         (a) DERATING: 117°C/WATT
   E. POWER DISSIPATION (DUAL DEVICE):
      (1) AT 25°C AMBIENT TEMPERATURE: 600 MILLIWATTS MAXIMUM.
         (a) DERATING: 292°C/WATT.
      (2) AT 25° CASE TEMPERATURE: 3.0 WATTS MAXIMUM.
         (a) DERATING: 58.3°C/WATT.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



GRAPHICAL SYMBOL



1010715

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO Contract NAS 9-497

DRAWN Patterson DATE 30 JAN 64
CHECKED Ed Foster 3 FEB 64
APPROVAL D. R. Test 7 APR 64
APPROVAL
NASA APPROVAL 4/7/64
MIT APPROVAL 4 Apr 64

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TRANSISTOR, DUAL, NPN,
SILICON

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010715
SCALE NONE
WT
SHEET 1 OF 4

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 07488	4/7/64	wlk
A	REVISIED PER TDRR 21423	8/3/65	wlk
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C	REVISED PER TDRR 23646	11/16/65	wlk
D	REVISED PER TDRR 29482	10 JUN 66	PHG
E	REVISED PER TDRR 29483	6/23/66	MGM
F	REVISED PER TDRR 30683	26AUG 66	JJB JI

REQUIREMENTS: (CONTINUED)

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. ALL UNITS SHALL HAVE SUCCESSFULLY PASSED THE FOLLOWING SCREENING TESTS PERFORMED DURING THE TIME INTERVAL BETWEEN FINAL SEAL AND THE 240 HOUR BURN-IN.
     - (1) ACCELERATION AT 20,000 G MINIMUM IN THE Y_1 ORIENTATION PER MIL-STD-750, METHOD 2006, OR IMPACT SHOCK AT 28K g MINIMUM IN THE Y_1 ORIENTATION.
     - (2) FINE LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION C, PROCEDURE III a OR b. A LEAK RATE OF 1×10^{-8} ATM CC/SEC OR GREATER SHALL CONSTITUTE A FAILURE.
     - (3) GROSS LEAK PER MIL-STD-202, METHOD 112, TEST CONDITION A. GLYCERIN MAY BE USED IN LIEU OF MINERAL OIL.
     - (4) FOLLOWING THE ABOVE AND PRIOR TO BURN-IN, THE MANUFACTURER SHALL PERFORM:
       - (a) DETERMINE COLLECTOR CUTOFF CURRENT, I_{CBO} AT +25°C (LIMIT: 15 nA MAX).
       - (b) VOLTAGE TEMPERATURE STRESS: UNITS SHALL BE STRESSED FOR 96 HOURS AT THE FOLLOWING CONDITIONS:
         - 1. AMBIENT TEMPERATURE: +150 ± 5°C.
         - 2. COLLECTOR VOLTAGE V_{CBO}: 90 ± 2 VOLTS PER SIDE
         - 3. UPON COMPLETION OF THE 100 HOUR STRESS, UNITS SHALL REMAIN ENERGIZED, AT THE SPECIFIED V_{CBO}, UNTIL THE AMBIENT TEMPERATURE HAS DECREASED TO +25°C AT A RATE OF 15 MIN. $\leq t \leq$ 30 MIN.
       - (c) DETERMINE COLLECTOR CUTOFF CURRENT, I_{CBO} AT +25°C, WITHIN 4 HOURS OF COMPLETION OF VOLTAGE TEMPERATURE STRESS (LIMIT: 15 nA MAX).
   - B. BURN-IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS.
     - (1) AMBIENT TEMPERATURE: +25° ±5°C.
     - (2) COLLECTOR VOLTAGE VCB: 60 ± 1 VOLT PER SIDE.
     - (3) POWER DISSIPATION: 342 MILLIWATTS TOTAL (171 MILLIWATTS PER SIDE) (TJ = +125°C).
   - C. THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
     - (1) SWITCHBACK VOLTAGE, LV_{CEO}
     - (2) COLLECTOR CUTOFF CURRENT, I_{CBO} AT T_A = 25°C.
       NOTE: MEASUREMENT FOLLOWING BURN-IN SHALL BE MADE WITHIN 4 HOURS.
     - (3) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}{}^1$
     - (4) STATIC FORWARD CURRENT TRANSFER RATIO hFE AT 100MA.
   - D. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING. THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN hFE OR HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} (THE ABSOLUTE INCREASE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.

T_{on} AND T_{off} TEST CIRCUIT

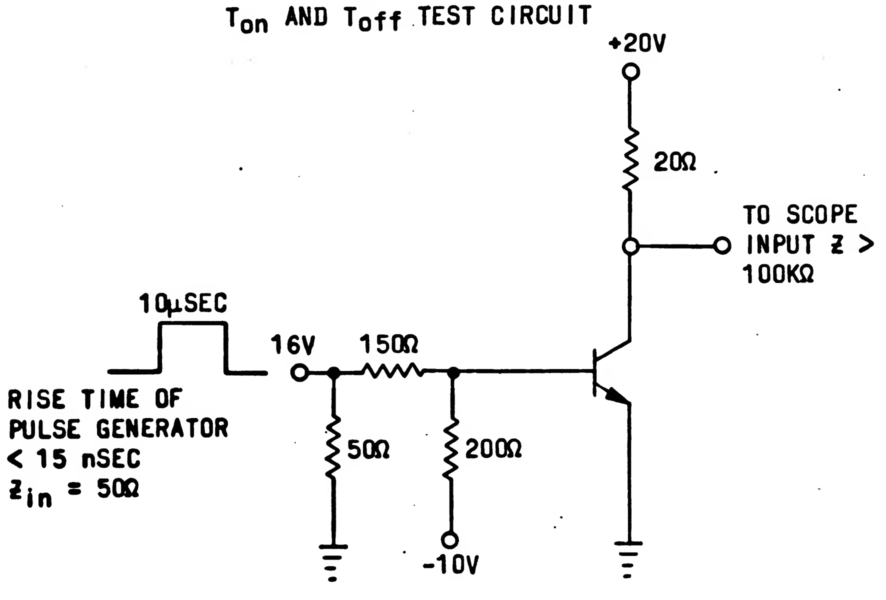

FIGURE 1

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
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TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

HEAT TREATMENT

FINAL FINISH

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DWG NO Contract NAS 9-497

DRAWN Patterson DATE 30 JAN 64
CHECKED Ed Foster 3 FEB 64
APPROVAL D. G. Test 7 APR 64
APPROVAL
NASA APPROVAL 4/17/64
MIT APPROVAL

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HOUSTON, TEXAS

TRANSISTOR, DUAL NPN,
SILICON

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	1010715
SCALE	WT	SHEET 2 OF 4

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REVISIONS

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C	REVISED PER TDRR 23646	11/16/65	WK
D	REVISED PER TDRR 29482	6-14-66	
E	REVISED PER TDRR 29483	6/23/66	
F	REVISED PER TDRR 30683	8-26-66	WB JI

TABLE 11

ELECTRICAL CHARACTERISTICS AT TC = +25°C (UNLESS OTHERWISE SPECIFIED)

NASA DASH NO.	PARAMETER	CONDITION	SYMBOL	SPECIFICATION LIMITS MIN	TYP	MAX	UNIT
-1	STATIC FORWARD CURRENT TRANSFER RATIO NOTE 1	I_C=1.0A, V_{CE}=2.0V	hFE1	50	80	150	
		I_C=2.0A, V_{CE}=5.0V	hFE2	40	75		
		I_C=100MA, V_{CE}=2.0V	hFE3	35	80		
	COLLECTOR SATURATION VOLTAGE NOTE 1	I_C=1.0A, I_B=0.1A	V_{CE}(SAT)1		0.2	0.57	VOLTS
		I_C=2.0A, I_B=0.2A	V_{CE}(SAT)2		0.35	0.90	VOLTS
	BASE SATURATION VOLTAGE NOTE 1	I_C=1.0A, I_B=0.1A	V_{BE}(SAT)1		1.0	1.23	VOLTS
		I_C=2.0A, I_B=0.2A	V_{BE}(SAT)2		1.1	1.37	VOLTS
	COLLECTOR CUTOFF CURRENT	I_E=0. V_{CB}=80V	I_{CBO}		5	15	NA
		I_E=0, V_{CB}=80V, T_C=+100°C	I_{CBO}		0.7	5.0	μA
		I_E=0, V_{CB}=80V, T_C=+150°C	I_{CBO}		5	20	μA
	COLLECTOR CUTOFF CURRENT	I_B=0, V_{CE}=60V	I_{CEO}		1.0	100	nA
	SMALL SIGNAL CURRENT GAIN	I_C=50MA, V_{CE}=10V, f=1KC	hfe	50	90		
	OUTPUT CAPACITANCE	I_E=0, V_{CB}=10V	C_{OB}		38	70	PF
	SWITCHBACK VOLTAGE NOTE 1	I_C=100MA, I_B=0	LV_{CEO}	80			VOLTS
	TURN ON TIME FIGURE 1	I_C=1.0A, $I_{B1} \approx$ 50MA	T_{ON}			0.3	μ SEC
	TURN OFF TIME FIGURE 1	I_C=1.0A, $I_{B1}=I_{B2} \approx$ 50MA	T_{OFF}			1.5	μ SEC
-2	COLLECTOR TO EMITTER VOLTAGE	I_C=100MA, I_B=0	LV_{CEO}	90			VOLTS
	COLLECTOR TO BASE VOLTAGE	I_C=100μA, I_E=0	BV_{CBO}	120			VOLTS
	EMITTER TO BASE VOLTAGE	I_E=100μA, I_C=0	BV_{EBO}	8.0			VOLTS
	COLLECTOR SATURATION VOLTAGE* NOTE 1	I_C=100MA, I_B=10MA	V_{CE}(SAT)			0.2	VOLTS
	COLLECTON SATURATION VOLTAGE* NOTE 1	I_C=2 AMP., I_B=200MA	V_{CE}(SAT)			0.8	VOLTS
	BASE SATURATION VOLTAGE* NOTE 1	I_C=100MA, I_B=10, MA	V_{BE} (SAT)			0.8	VOLTS
	BASE SATURATION VOLTAGE* NOTE 1	I_C=2 AMP., I_B=200MA	V_{BE} (SAT)			1.4	VOLTS
	DC CURRENT GAIN* NOTE 1	I_C=10MA, V_{CE}=2V	h_{FE1}	20			

TABLE 1

MAXIMUM RATINGS TC = +25°C

NASA DASH NO.	COLLECTOR VOLTAGE V_{CBO}	EMITTER VOLTAGE V_{EBO}	COLLECTOR VOLTAGE V_{CEO}	COLLECTOR POWER DISSIPATION
-1	V_{DC}	V_{DC}	V_{DC}	W
	120	5	100	3.0 (1.5 PER UNIT)
-2	120	8	100	3.0 (1.5 PER UNIT)

*NOTE 1 PULSED: LENGTH ≤ 300 μSEC; DUTY CYCLE ≤ 1%

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
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DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO Contract NAS 9-497
DRAWN Patterson DATE 30 JAN 64
CHECKED Ed Foster 3 FEB 64
APPROVAL D.R. 7 APR 64
APPROVAL
NASA APPROVAL 4/7/64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR, DUAL, NPN,
SILICON
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010715
SCALE
WT
SHEET 3 OF 4

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS							
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REVISED PER TDRR 21423 (THIS SHEET ADDED)				WR	
B		REVISED PER TDRR 22142			9/7/65	MGM	9/14/
C		REVISED PER TDRR 23646			11/16/65	WR	
D		REVISIED PER TDRR 29482			6-14-66	[illegible]	
E		REVISED PER TDRR 29483			6/23/66	[illegible]	
F		REVISED PER TDRR 30683	JJB	JI	26AUG 66		

TABLE II (CONTINUED)

NASA DASH NO	ELECTRICAL CHARACTERISTICS AT TC = +25°C	(UNLESS OTHERWISE SPECIFIED)		SPECIFICATION LIMITS			
	PARAMETER	CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
-2	DC CURRENT GAIN* NOTE 1	I_C =100mA., V_{CE} =2V	h_{FE2}	80			
	DC CURRENT GAIN* NOTE 1	I_C=1 AMP., V_{CE}=2V	h_{FE5}	50			
	HIGH FREQUENCY CURRENT GAIN	I_C=200 MA, V_{CE}=10V, f =20mc	h_{fe}(20mc)	1.5			
	COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=80V	I_{CBO}			15	MμA
	COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=80V	I_{CBO}(150°C)			20	μA
	OUTPUT CAPACITANCE	I_E=0, V_{CB}=10V	C_{Ob}			45	pf
	OUTPUT CAPACITANCE DIFFERENCE		NOTE 2 $C_{OB1} - C_{OB2}$			15	pf
	TURN ON TIME FIGURE 2	I_C=100MA, I_B=5MA	T_{ON}			0.47	μSEC
	TURN OFF TIME FIGURE 2	I_C=100MA, =20xI_{B1} 20x1_{B2}	T_{OFF}			2.5	μSEC
	DC CURRENT GAIN RATIO	I_C=100 MA, V_{CE}= 2V	h_{FE1} / h_{FE2} NOTE 2	0.8		1.0	
	V_{CE} SATURATION VOLTAGE DIFFERENCE	I_B=5MA I_C=100MA	$V_{CE1} - V_{CE2}$ NOTE 2			50	MV

NOTE 2: FOR DIFFERENCE OR RATIO TESTS BETWEEN SIDE I AND SIDE 2 OF THE DUAL DEVICE, PARAMETER NO. I IS DEFINED AS THE HIGHER NUMERICAL VALUE.

T ON AND T OFF TEST CIRCUIT

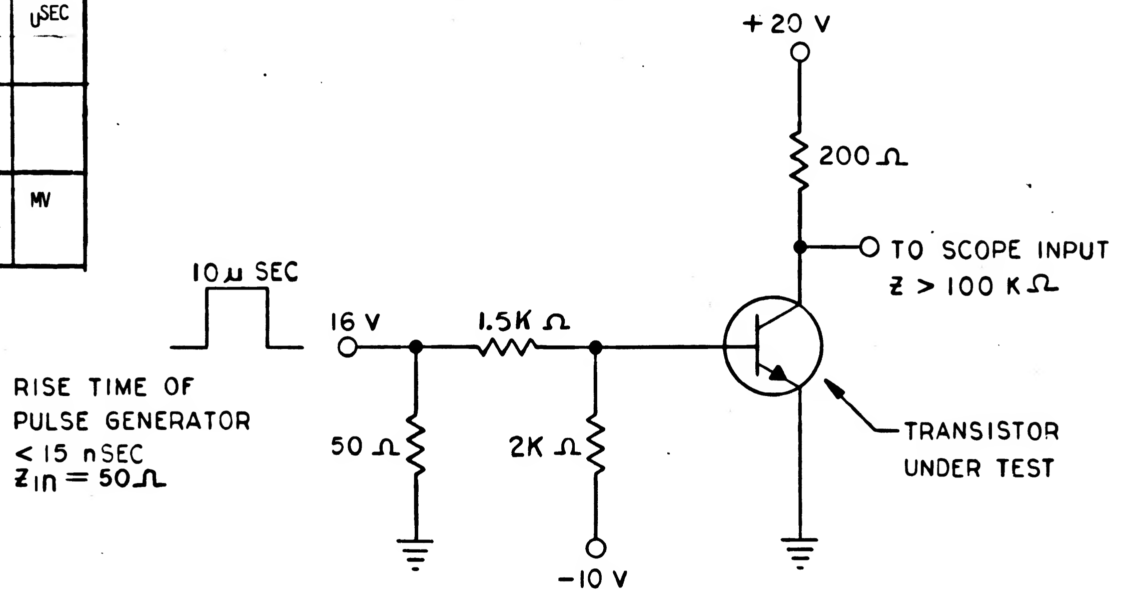

FIGURE 2

Ⓐ THIS SHEET ADDED

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LIST OF MATERIALS

NEXT ASSY	USED ON

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RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
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CAMBRIDGE, MASS.

DRAWN Louis S. Alcorl Aug 27 65
CHECKED [illegible] Aug 27 65
APPROVED [illegible] Aug 27 65
APPROVED
APPROVED MIT W Kupfer 3 Aug 65
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSISTOR DUAL NPN SILICON

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	DRAWING NO.
80230	C	1010715

SCALE —— SHEET 4 OF 4

1010715

4 3 2 1

— 1010715

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 07488	4/7/64	

REVISIONS

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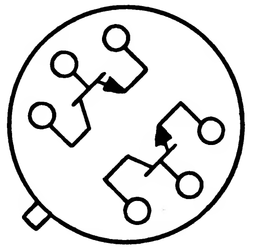
REQUIREMENTS:

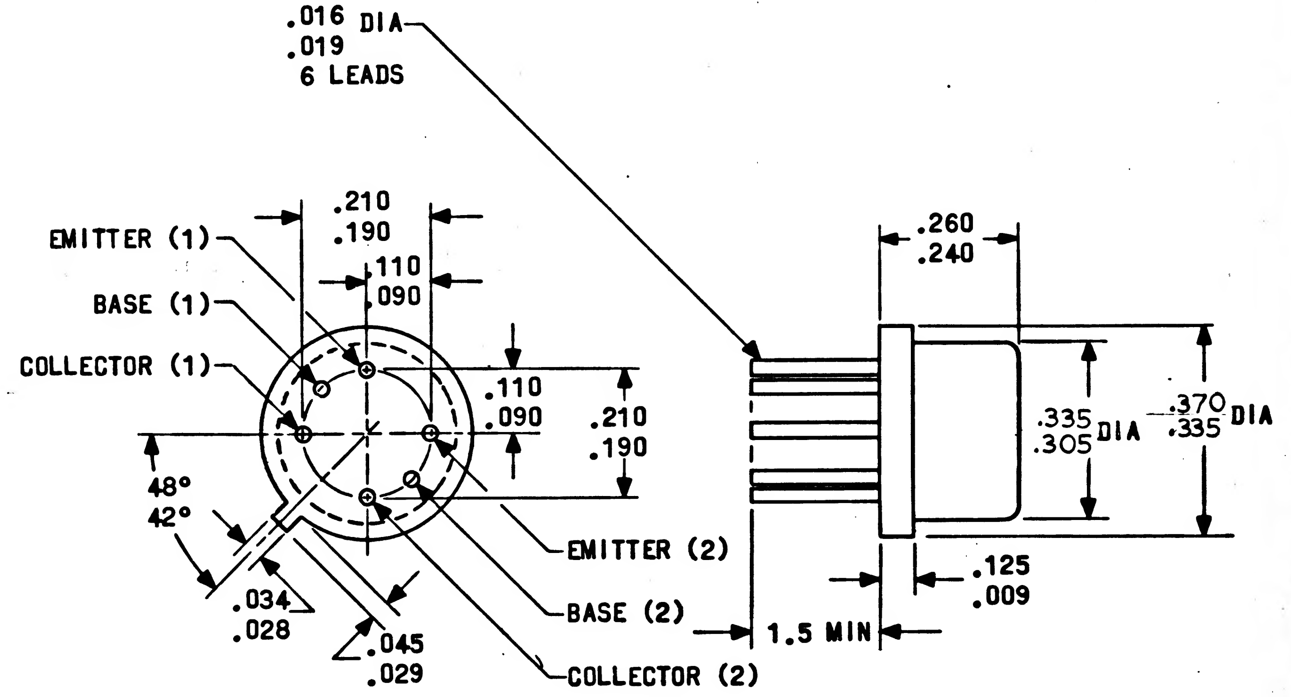
1. GENERAL:
   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   B. THE SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   C. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002051 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   D. PACKAGING AND PACKING: UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-S-19491, LEVEL A.

2. INSPECTION AND ACCEPTANCE:
   A. MECHANICAL REQUIREMENTS:
      (1) MARKING: THE NASA DRAWING NUMBER WHICH SHALL CONSIST OF AT LEAST THE LAST THREE DIGITS, REVISION LETTER, AND THE MANUFACTURER'S NAME, TRADEMARK, OR CODE, DATE CODE, AND SERIAL NUMBER SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND1002019 MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-STD-129 AND SHALL INCLUDE THE NASA DRAWING NUMBER AND REVISION LETTER.
      (2) LEAD DATA: KOVAR, GOLD PLATED PER ND 1015402. A CERTIFICATE OF COMPLIANCE FOR THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
      (3) DIMENSIONS PER DRAWING
   B. ELECTRICAL REQUIREMENTS: PER TABLE II.
      (1) COLLECTOR CUTOFF CURRENT I_{CBO} AT 100°C
      (2) SWITCHBACK VOLTAGE, LV_{CEO}
      (3) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}, h_{FE2}, h_{FE3}
      (4) BASE SATURATION VOLTAGE, $V_{BE(SAT)}$
      (5) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$

3. DESIGN REQUIREMENTS:
   A. JUNCTION TEMPERATURE: -65°C TO +200°C.
   B. ELECTRICAL RATING: PER TABLE I.
   C. ELECTRICAL SPECIFICATION: PER TABLE II.
   D. POWER DISSIPATION (EACH SIDE):
      (1) AT 25°C AMBIENT TEMPERATURE: 500 MILLIWATTS MAXIMUM.
         (a) DERATING: 350°C/WATT
      (2) AT 25°C CASE TEMPERATURE: 1.5 WATTS MAXIMUM.
         (a) DERATING: 117°C/WATT
   E. POWER DISSIPATION (DUAL DEVICE):
      (1) AT 25°C AMBIENT TEMPERATURE: 600 MILLIWATTS MAXIMUM.
         (a) DERATING: 292°C/WATT.
      (2) AT 25° CASE TEMPERATURE: 3.0 WATTS MAXIMUM.
         (a) DERATING: 58.3°C/WATT.



GRAPHICAL SYMBOL



SHEET 1	SHEET 2	SHEET 3
REVISION STATUS OF SHEETS		

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

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DWG. NO. Contract NAS 9-497
DRAWN Patterson DATE 30 JAN 64
CHECKED Ed Foster 3 FEB 64
APPROVAL D. R. Test 7 APR 64
APPROVAL
NASA APPROVAL 4/7/64
MIT APPROVAL 4/7/64

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SILICON

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010715
SCALE NONE WT SHEET 1 OF 3

4 3 2 1

INCHES
0 1 2
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— 1010715

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 07488	4/7/64	wlk

REQUIREMENTS: (CONTINUED)

4. SPECIAL CONDITIONING BY SUPPLIER:
   A. BURN IN: UNITS SHALL BE BURNED-IN FOR 240 HOURS AT THE FOLLOWING CONDITIONS:
      (1) AMBIENT TEMPERATURE: +25° ± 5°C.
      (2) COLLECTOR VOLTAGE V_{CB}: 20 ± 1 VOLT PER SIDE.
      (3) POWER DISSIPATION: 342 MILLIWATTS TOTAL (171 MILLIWATTS PER SIDE) (T_J=+125°C).
   B. THE MANUFACTURER SHALL DETERMINE AND RECORD THE FOLLOWING ELECTRICAL CHARACTERISTICS PRIOR TO AND FOLLOWING BURN-IN:
      (1) SWITCHBACK VOLTAGE, LV_{CEO}
      (2) COLLECTOR CUTOFF CURRENT, I_{CBO} AT T_A=25°C.
      (3) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)1}$
      (4) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1}
   C. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL TRANSISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS. HISTOGRAMS SHALL BE PLOTTED TO SHOW THE FREQUENCY DISTRIBUTION OF THE ABSOLUTE VALUE OF EACH CHARACTERISTIC AND TO SHOW THE FREQUENCY DISTRIBUTION OF THE PERCENT CHANGE OF EACH CHARACTERISTIC FROM ITS INITIAL READING. UNITS FAILING TO MEET INITIAL DRAWING REQUIREMENTS OR HAVING CHANGED MORE THAN 20% IN h_{FE} OR HAVING INCREASED MORE THAN 3 TIMES IN I_{CBO} (THE ABSOLUTE INCREASE MUST BE GREATER THAN 5 NANOAMPERE) SHALL NOT BE ACCEPTABLE.

T_{on} AND T_{off} TEST CIRCUIT

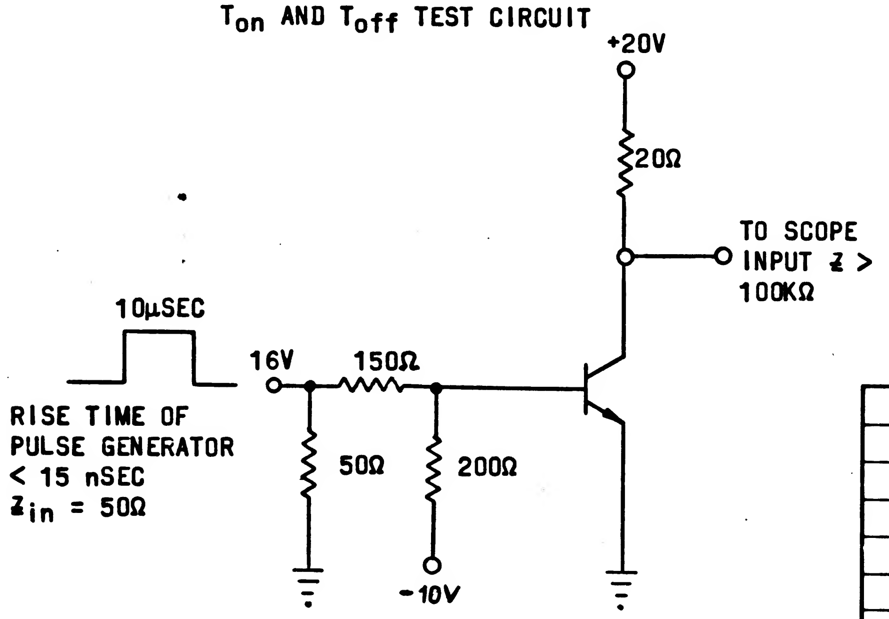

FIGURE 1

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 07488	4/7/64	WK.

TABLE I

NASA DASH NO	MAXIMUM RATINGS TC = +25°C			
	COLLECTOR VOLTAGE V_{CBO}	EMITTER VOLTAGE V_{EBO}	COLLECTOR VOLTAGE V_{CEO}	COLLECTOR POWER DISSIPATION
	V_{DC}	V_{DC}	V_{DC}	W
-1	120	5	100	3.0 (1.5 PER UNIT)

TABLE II

ELECTRICAL CHARACTERISTICS AT TC = +25°C (UNLESS OTHERWISE SPECIFIED)

PARAMETER	CONDITION	SYMBOL	SPECIFICATION LIMITS			
			MIN	TYP	MAX	UNIT
STATIC FORWARD CURRENT TRANSFER RATIO NOTE 1	I_C=1.0A, V_{CE}=2.0V	h_{FE1}	50	80	150	
	I_C=2.0A, V_{CE}=5.0V	h_{FE2}	40	75		
	I_C=100MA, V_{CE}=2.0V	h_{FE3}	35	80		
COLLECTOR SATURATION VOLTAGE NOTE 1	I_C=1.0A, I_B=0.1A	$V_{CE(SAT)1}$		0.2	0.57	VOLTS
	I_C=2.0A, I_B=0.2A	$V_{CE(SAT)2}$		0.35	0.90	VOLTS
BASE SATURATION VOLTAGE NOTE 1	I_C=1.0A, I_B=0.1A	$V_{BE(SAT)1}$		1.0	1.23	VOLTS
	I_C=2.0A, I_B=0.2A	$V_{BE(SAT)2}$		1.1	1.37	VOLTS
COLLECTOR CUTOFF CURRENT	I_E=0, V_{CB}=80V	I_{CBO}		5	15	NA
	I_E=0, V_{CB}=80V, T_C=+100°C	I_{CBO}		0.7	5.0	µA
	I_E=0, V_{CB}=80V, T_C=+150°C	I_{CBO}		5	20	µA
COLLECTOR CUTOFF CURRENT	I_B=0, V_{CE}=60V	I_{CEO}		1.0	50	µA
SMALL SIGNAL CURRENT GAIN	I_C=50MA, V_{CE}=100, f=1KC	h_{fe}	50	90		
OUTPUT CAPACITANCE	I_E=0, V_{CB}=10V	C_{OB}		38	70	PF
SWITCHBACK VOLTAGE NOTE 1	I_C=100MA, I_B=0	LV_{CEO}	80			VOLTS
TURN ON TIME FIGURE 1	I_C=1.0A, $I_{B1} \approxeq$ 50MA	T_{on}			0.3	µSEC
TURN OFF TIME FIGURE 1	I_C=1.0A, $I_{B1}=I_{B2} \approxeq$ 50MA	T_{off}			1.5	µSEC

NOTE 1 PULSED: LENGTH $\leq$ 300 µSEC; DUTY CYCLE $\leq$ 1%

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
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DO NOT SCALE THIS DRAWING
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SCALE
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SHEET 3 OF 3

INCHES
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A 1010717

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04953	12/3/63	
A	REVISED PER TDRR 15697	2/2/65	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 3.
   - C. MARKING: INTERMEDIATE AND SHIPPING CONTAINERS SHALL BE MARKED PER MIL-STD-129 WITH THE NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER, INCLUDING MANUFACTURER'S NAME AND PART NO.
2. INSPECTION AND ACCEPTANCE:
   - A. DIMENSIONS: AS SPECIFIED IN TABLE I
3. DESIGN REQUIREMENTS:
   - A. MATERIAL: BRASS PER QQ-B-613, COMPOSITION 2
     - (1) FINISH: HOT TIN DIP PER MIL-T-10727, TYPE II

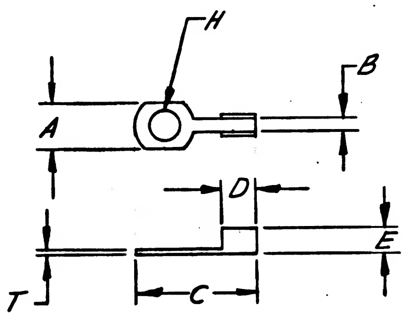

FIGURE 1

TABLE I

DASH NO.	DIM. A	DIM. B	DIM. C	DIM. D	DIM. E	DIM.	DIM. T	FIGURE
	±.005	±.005	±.005	±.005	±.005	H	±.005	
1	.187	.046	.375	.125	.062	.123 .129	.016	1
2	.250	.156	.437	.125	.125	.151 .157	.032	2

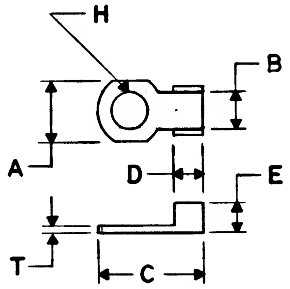

FIGURE 2

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
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FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
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DRAWN THENO DATE 11-20
CHECKED 11-29-63
APPROVAL 12/3
APPROVAL
NASA APPROVAL 12-3-63
MIT APPROVAL 12/3/63

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NASA DRAWING NO. 1010717
SCALE —
WT
SHEET 1 OF 1

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1010717 B

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04953	12/3/63	
A	REVISED PER TDRR 15697	2/2/65	WK
B	REVISED PER TDRR 19919	6/15/65	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 3.
   - C. MARKING: INTERMEDIATE AND SHIPPING CONTAINERS SHALL BE MARKED PER MIL-STD-129 WITH THE NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER, INCLUDING MANUFACTURER'S NAME AND PART NO.
2. INSPECTION AND ACCEPTANCE:
   - A. DIMENSIONS: AS SPECIFIED IN TABLE I
3. DESIGN REQUIREMENTS:
   - A. MATERIAL: BRASS PER QQ-B-613, COMPOSITION 2
     - (1) FINISH: HOT TIN DIP PER MIL-T-10727, TYPE II

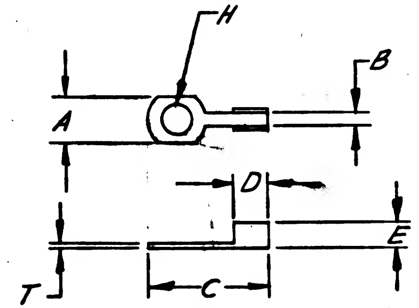

FIGURE I

TABLE I

DASH NO.	DIM A	DIM B	DIM C	DIM D	DIM E	DIM	DIM T	FIGURE
	±.005	±.005	±.005	±.005	±.005	H	±.005	
1	.187	.046	.375	.125	.062	.123 .129	.016	1
2	.250	.156	.437	.125	.125	.151 .157	.032	2
3	.312	.062	.531	.203	.094	.141 .147	.018	2

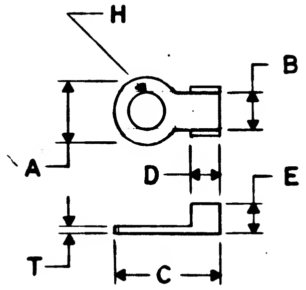

FIGURE 2

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
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UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
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DRAWN THENO DATE 11-20
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APPROVAL
NASA APPROVAL W. J. 12-3-63
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C 1010717

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04953	12/3/63	[illegible]
A	REVISED PER TDRR 15697	2/2/65	WK
B	REVISED PER TDRR 19919	6/15/65	WK
C	REVISED PER TDRR 23463	11/2/65	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 3.
   - C. MARKING: INTERMEDIATE AND SHIPPING CONTAINERS SHALL BE MARKED PER MIL-STD-129 THE NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER, INCLUDING MANUFACTURER'S NAME AND PART NO. SHALL BE LEGIBLY IDENTIFIED PER ND1002019
2. INSPECTION AND ACCEPTANCE:
   - A. DIMENSIONS: AS SPECIFIED IN TABLE I
3. DESIGN REQUIREMENTS:
   - A. MATERIAL: BRASS PER QQ-B-613, COMPOSITION 2
     - (1) FINISH: HOT TIN DIP PER MIL-T-10727, TYPE II

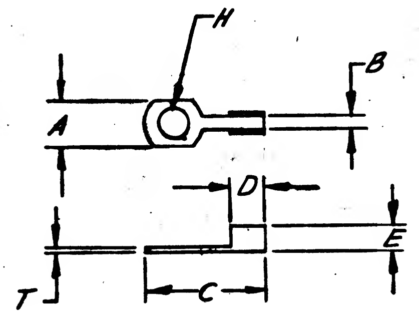

FIGURE 1

TABLE I

DASH NO.	DIM. A ±.005	DIM. B ±.005	DIM. C ±.005	DIM. D ±.005	DIM. E ±.005	DIM. H	DIM. T ±.005	FIGURE
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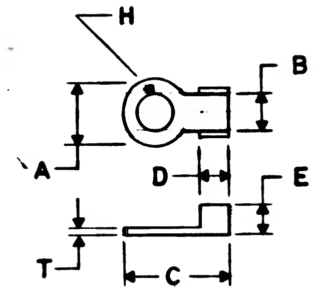

FIGURE 2

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

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CHECKED [illegible] 11-29-63
APPROVAL [illegible] 12/3
APPROVAL
NASA APPROVAL W. J. [illegible] 12-3-63
MIT APPROVAL [illegible] 12/3/63

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NASA DRAWING NO. 1010717
SCALE —
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

D	1010717

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04953	12/3/63	[illegible]
A	REVISED PER TDRR 15697	2/2/65	WK
B	REVISED PER TDRR 19919	6/15/65	WK
C	REVISED PER TDRR 23463	11/2/65	WK
D	REVISED PER TDRR 25366	2/1/66	WK

REQUIREMENTS:

1. GENERAL:

   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

   B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 3.

   C. MARKING: INTERMEDIATE AND SHIPPING CONTAINERS SHALL BE MARKED PER MIL-STD-129 THE NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER, INCLUDING MANUFACTURER'S NAME AND PART NO. SHALL BE LEGIBLY IDENTIFIED PER ND1002019

2. INSPECTION AND ACCEPTANCE:

   A. DIMENSIONS: AS SPECIFIED IN TABLE I

3. DESIGN REQUIREMENTS:

   A. MATERIAL: BRASS PER QQ-B-613, COMPOSITION 2

      (1) FINISH: HOT TIN DIP PER MIL-T-10727, TYPE II

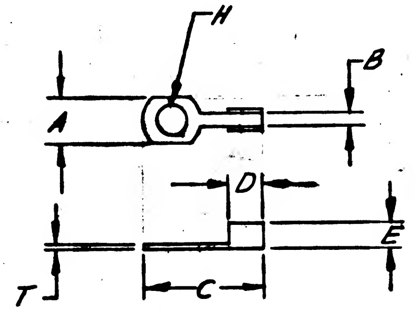

FIGURE 1

TABLE I

DASH NO.	DIM. A	DIM. B	DIM. C	DIM. D	DIM. E	DIM.	DIM. T	FIGURE
	±.005	±.005	±.015	±.015	±.005	H	±.005	
1	.187	.046	.375	.125	.062	.123 .129	.016	1
2	.250	.078	.437	.125	.125	.151 .157	.032	2
3	.312	.062	.531	.203	.094	.141 .147	.018	2

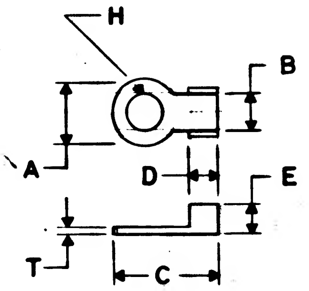

FIGURE 2

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN THENO DATE 11-20
CHECKED [illegible] 11-29-63
APPROVAL [illegible] 12/3
APPROVAL
NASA APPROVAL [illegible] 12-3-63
MIT APPROVAL [illegible] 12/3/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL, LUG

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	1010717
SCALE —	WT	SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

— 1010717

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 04953	12/3/63	

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 3.
   - C. MARKING: INTERMEDIATE AND SHIPPING CONTAINERS SHALL BE MARKED PER MIL-STD-129 WITH THE NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER, INCLUDING MANUFACTURER'S NAME AND PART NO.
2. INSPECTION AND ACCEPTANCE:
   - A. DIMENSIONS: AS SPECIFIED IN TABLE I
3. DESIGN REQUIREMENTS:
   - A. MATERIAL: BRASS PER QQ-B-613, COMPOSITION 2
     - (1) FINISH: HOT TIN DIP PER MIL-T-10727, TYPE II

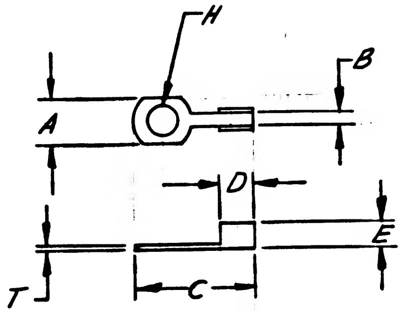

TABLE I

DASH NO.	DIM. A ±.005	DIM. B ±.005	DIM. C ±.005	DIM. D ±.005	DIM. E ±.005	DIM. H	DIM. T ±.005	
1	.187	.046	.375	.125	.062	.123 .129	.016	

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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INSTRUMENTATION LAB
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DWG. NO. CONTRACT

DRAWN THENO DATE 11-20
CHECKED G. Matto 11-29-63
APPROVAL 12/3
APPROVAL
NASA APPROVAL W. J. 12-3-63
MIT APPROVAL 12/3/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL, LUG

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010717
SCALE —
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010724	—

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 14715	12-8-64	

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF MIL-T-27 WITH THE ADDITIONS AND EXCEPTIONS SPECIFIED HEREIN.
   - C. SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404, CLASS 2.
   - D. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002047.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - 1) LEADS: NICKEL WIRE PER ND 1015400. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
     - 2) MARKING: MARK PERMANENTLY AND LEGIBLY WITH THE NASA DRAWING NUMBER AND REVISION LETTER, MANUFACTURER'S NAME AND/OR SYMBOL, MANUFACTURER'S SERIAL AND/OR LOT CODE NUMBER AND LEAD IDENTIFICATION. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART AND PACKAGE. MARK IN ACCORDANCE WITH ND 1002019.
     - 3) DIMENSIONS: SEE FIGURE I
     - 4) COLOR: UNIT SHALL BE FINISHED WITH COLOR 514 OF ANA BULLETIN 157 (INSTRUMENT BLACK)
   - B. ELECTRICAL REQUIREMENTS: UNIT SHALL MEET ALL REQUIREMENTS OF TABLE I.

3. DESIGN REQUIREMENTS:
   - A. THE UNIT SHALL MEET ALL REQUIREMENTS OF MIL-T-27 FOR GRADE 5, CLASS R LIFE EXPECTANCY X, FAMILY 09, IN AN AMBIENT TEMPERATURE OF 85°C.
   - B. THE UNIT SHALL MEET ALL ELECTRICAL REQUIREMENTS EXCEPT WHERE NOTED, BEFORE, DURING, AND AFTER THE FOLLOWING EXPOSURES:
     - 1) HIGH TEMPERATURE: 71°C OPERATING
     - 2) LOW TEMPERATURE: -18°C OPERATING
     - 3) VIBRATION: 10 TO 2000 CPS, 20 G (PER MIL-STD-202, METHOD 204A, CONDITION D)
     - 4) ALTITUDE: (REDUCED PRESSURE) 96 HOURS AT A PRESSURE OF 10^{-4} MM OF MERCURY.
     - 5) SHOCK: PER MIL-STD-810, PROCEDURE I, EXCEPT USE 100 G
   - C. MAXIMUM WORKING VOLTAGE: 50 VOLTS
   - D. ELECTROSTATIC SHIELD AND CORE SHALL BE CONNECTED TO PIN NUMBER 9.
   - E. PRIMARY DC CURRENT: 2 MA MAX.
4. SPECIAL CONDITIONING BY MANUFACTURER (100%):
   - A. TRANSFORMER SHALL BE TEMPERATURE CYCLED FOR 5 CYCLES PER MIL-STD-202 METHOD 102 EXCEPT THAT THE TEMPERATURES SHALL BE -55°C, +25°C AND +105°C AND EXPOSURE TIME SHALL BE 15 MINUTES AT EACH TEMPERATURE. DURING THE LAST CYCLE THE UNIT SHALL BE TESTED FOR CONTINUITY AT EACH OF THE AMBIENT CONDITIONS. AFTER STABILIZATION AT ROOM TEMPERATURE UNIT SHALL PASS NORMAL INSPECTION TESTS.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —   DECIMALS ±   ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO   CONTRACT
DRAWN H. NORLING   DATE 19 JUNE 64
CHECKED H. Dubl 24 Jun '64
APPROVAL G. Cushman 4 Dec 64
APPROVAL
NASA APPROVAL 12-8-64
MIT APPROVAL 8 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER, POWER,
STEP-DOWN
(5-2.5/2.5/2.5 VOLTS,800 CPS, 3.75 MW)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010724
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

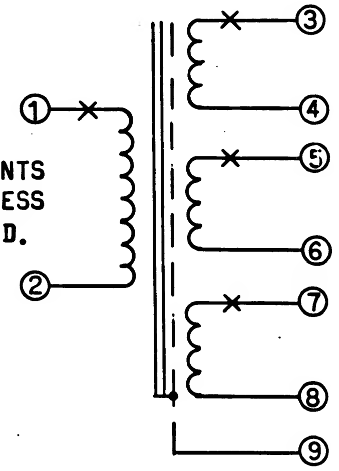
— 1010724

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 14715	12-8-64	

TABLE I
INSPECTION TESTS

TITLES IN PARAGRAPH COLUMN REFER TO PARAGRAPH TITLES IN SPECIFICATION MIL-T-27	
PARAGRAPH	
SEALING	IMMERSE IN LIQUID AS INDICATED
DIELECTRIC STRENGTH	APPLY 200 VOLTS BETWEEN WINDINGS AND BETWEEN WINDINGS AND SHIELD
INSULATION RESISTANCE	10,000 MEGOHMS MINIMUM AT 20°C. (USE 100 VOLTS DC)
FULL LOAD VOLTAGE	WITH AN INPUT OF 5.0 VOLTS, 800 CPS (1-2) THE FULL LOAD OUTPUT VOLTAGE SHALL BE: V(3-4) = 2.500 ± 0.075 VOLTS WITH 0.5 MA (3-4) V(5-6) = 2.500 ± 0.075 VOLTS WITH 0.5 MA (5-6) V(7-8) = 2.500 ± 0.075 VOLTS WITH 0.5 MA (7-8) LOADS ARE SIMULTANEOUS AND RESISTIVE
	REGULATION = 14% MAXIMUM. PERCENT REGULATION = $100 \frac{(\text{NO LOAD VOLTAGE MINUS FULL LOAD VOLTAGE})}{\text{FULL LOAD VOLTAGE}}$
DC RESISTANCE	R (1-2) = 320 OHMS MAXIMUM, R (3-4) = 240 OHMS MAXIMUM R (5-6) = 250 OHMS MAXIMUM, R (7-8) = 270 OHMS MAXIMUM
OPEN CIRCUIT INDUCTANCE	SHALL BE 2.2 Hy. ± 20% WITH 5 VOLTS, 800 CPS, 2 MADC APPLIED (1-2)
ELECTROSTATIC SHIELDING	BETWEEN PRIMARY AND SECONDARIES MEASURED AT 800 CPS SHALL HAVE A SHIELD RATIO 7 db MINIMUM
POLARITY	TERMINALS 1, 3, 5 AND 7 SHALL BE OF LIKE POLARITY.

VOLTAGES AND CURRENTS ARE RMS VALUES UNLESS OTHERWISE SPECIFIED.



SCHEMATIC DIAGRAM

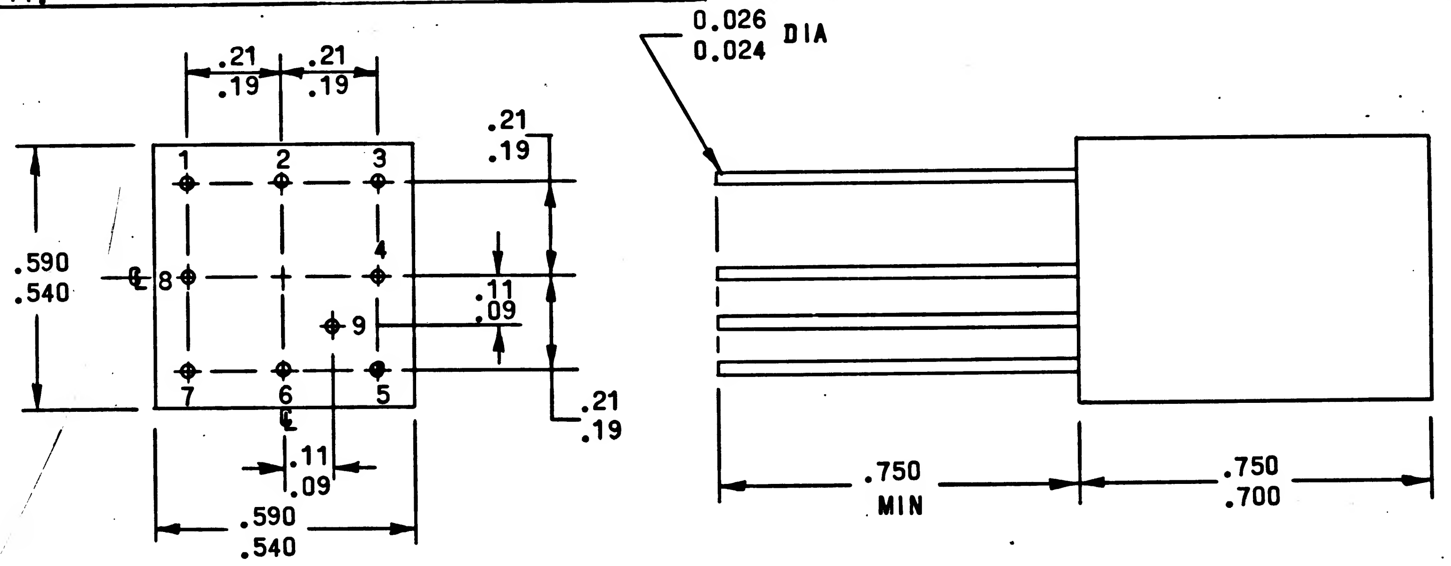


FIGURE 1

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
Contract NAS 9-497
DRAWN Norling DATE 19-JUN-64
CHECKED W. Diehl 24 Jun 64
APPROVAL D Cushman 4 Dec '64
Dist APPROVAL
NASA APPROVAL W J Rhine 12-2-64
MIT APPROVAL W Kupfer 8 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER, POWER,
STEP-DOWN
(5-2.5/2.5/2.5 VOLTS,800 CPS, 3.75 MW)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010724
SCALE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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–	1010725

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
–	INITIAL RELEASE CLASS A PER TDRR 14715	12-8-64	

REQUIREMENTS:

1. GENERAL:
   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

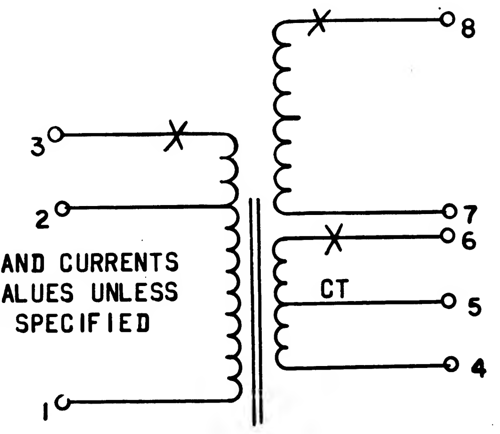
   B. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF MIL-T-27 WITH THE ADDITIONS AND EXCEPTIONS SPECIFIED HEREIN.
   C. SUPPLIERS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404, CLASS 2.
   D. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002047.

2. INSPECTION AND ACCEPTANCE:
   A. MECHANICAL REQUIREMENTS:
      (1) LEADS: NICKEL WIRE PER ND 1015400. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
      (2) MINIMUM MARKING: MARK PERMANENTLY AND LEGIBLY WITH THE NASA DRAWING NUMBER AND REVISION LETTER, MANUFACTURER'S NAME AND/OR SYMBOL, MANUFACTURER'S SERIAL AND/OR LOT CODE NUMBER AND LEAD IDENTIFICATION. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART AND PACKAGE.
      (3) DIMENSIONS: SEE FIGURE 1.
      (4) COLOR: UNIT SHALL BE FINISHED WITH COLOR 514 OF ANA BULLETIN 157 (INSTRUMENT BLACK)
   B. ELECTRICAL REQUIREMENTS: UNIT SHALL MEET ALL REQUIREMENTS OF TABLE I.

3. DESIGN REQUIREMENTS:
   A. THE UNIT SHALL MEET ALL REQUIREMENTS OF MIL-T-27 FOR GRADE 5, CLASS R LIFE EXPECTANCY X, FAMILY 09, IN AN AMBIENT TEMPERATURE OF 85°C.
   B. THE UNIT SHALL MEET ALL ELECTRICAL REQUIREMENTS EXCEPT WHERE NOTED, BEFORE, DURING, AND AFTER THE FOLLOWING EXPOSURES:
      (1) HIGH TEMPERATURE: 71°C OPERATING
      (2) LOW TEMPERATURE: -18°C OPERATING
      (3) VIBRATION: 10 TO 2000 CPS, 20 G (PER MIL-STD-202, METHOD 204A, CONDITION D)
      (4) ALTITUDE (REDUCED PRESSURE): 96 HOURS AT A PRESSURE OF 10^{-4} MM OF MERCURY.
      (5) SHOCK: PER MIL-STD-810, PROCEDURE I, EXCEPT USE 100 G.
   C. MAXIMUM WORKING VOLTAGE: 175 VOLTS

4. SPECIAL CONDITIONING BY MANUFACTURER (100%):
   A. TRANSFORMER SHALL BE TEMPERATURE CYCLED FOR 5 CYCLES PER MIL-STD-202 METHOD 102 EXCEPT THAT THE TEMPERATURES SHALL BE -55°C, +25°C AND +105°C AND EXPOSURE TIME SHALL BE 15 MINUTES AT EACH TEMPERATURE. DURING THE LAST CYCLE THE UNIT SHALL BE TESTED FOR CONTINUITY AT EACH OF THE AMBIENT CONDITIONS. AFTER STABILIZATION AT ROOM TEMPERATURE UNIT SHALL PASS NORMAL PRODUCTION TESTS.

VOLTAGES AND CURRENTS ARE RMS VALUES UNLESS OTHERWISE SPECIFIED



SCHEMATIC DIAGRAM

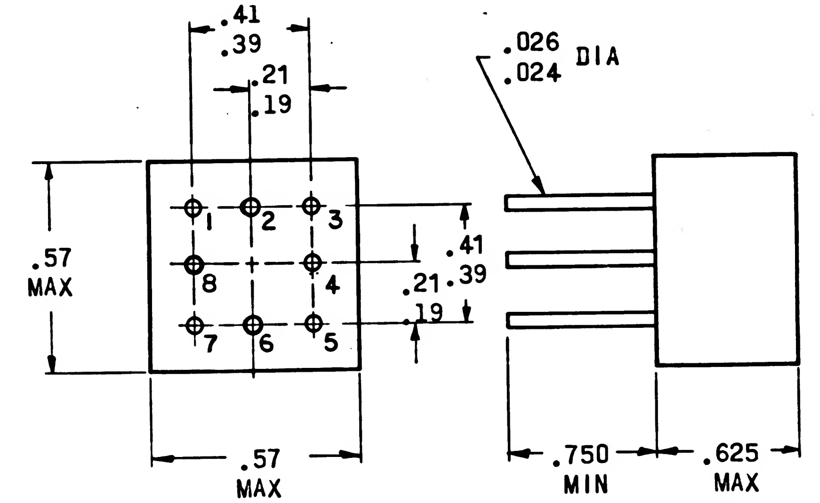


FIGURE 1

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG NO CONTRACT NAS 9-497
DRAWN W KOLAR DATE 24 JUN 64
CHECKED RW Heid 26 JUN 64
APPROVAL G Cushman 8 Dec '64
APPROVAL
NASA APPROVAL W J Rhine 12-8-64
MIT APPROVAL W Kupfer 8 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER, POWER, STEP-DOWN-
26 TO 8 CT VOLTS, 800 CPS, 1MW

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010725
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

4 3 2 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

—	1010725

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 14715	12-8-64	

TABLE I
INSPECTION TESTS

TITLES IN PARAGRAPH COLUMN REFER TO TITLES IN SPECIFICATION MIL-T-27.	
PARAGRAPH	
SEALING	IMMERSE IN LIQUID AS INDICATED.
DIELECTRIC STRENGTH	APPLY 500 VOLTS (RMS) BETWEEN WINDINGS.
INDUCED VOLTAGE	APPLY 52 VOLTS, 1600 CPS TO TERMINALS 1&2, SECONDARY OPEN
INSULATION RESISTANCE	10,000 MEGOHMS MINIMUM AT 20°C
NO LOAD VOLTAGE RATIO	WITH AN INPUT OF 26 VOLTS, 800 CPS TERMINALS (1-2), THE NO LOAD OUTPUT VOLTAGE RATIO SHALL BE: $\frac{V(4-5)}{V(1-2)} = 0.154 \pm 0.5\%$: $\frac{V(5-6)}{V(1-2)} = 0.154 \pm 0.5\%$: $\frac{V(4-5)}{V(1-2)} = \frac{V(5-6)}{V(1-2)} \pm 0.1\%$: $\frac{V(8-7)}{V(1-2)} = 1.0 \pm 2\%$ THEN WITH AN INPUT OF 28 VOLTS, 800 CPS TERM.(1-3), THE NO LOAD OUTPUT VOLTAGE RATIO SHALL BE: $\frac{V(4-5)}{V(1-3)} = 0.143 \pm 0.5\%$: $\frac{V(5-6)}{V(1-3)} = 0.143 \pm 0.5\%$: $\frac{V(4-5)}{V(1-3)} = \frac{V(5-6)}{V(1-3)} \pm 0.1\%$
FULL LOAD VOLTAGE RATIO	WITH AN INPUT OF 26 VOLTS, 800 CPS TERMINALS (1-2), THE FULL LOAD OUTPUT VOLTAGE RATIO SHALL BE : V(4-5)/V(1-2) = 0.1525 MINIMUM WITH A 4.2K OHM LOAD (4-5). V(5-6)/V(1-2) = 0.1525 MINIMUM WITH A 4.2K OHM LOAD (5-6). V(4-5)/V(1-2) = V(5-6)/ V(1-2) ±0.1%. LOADS ARE NON-SIMULTANEOUS
	PRIMARY IMPEDANCE (1-2): SHALL BE 50 K OHMS MINIMUM WITH 26 VOLTS, 800 CPS APPLIED, SECONDARY OPEN.
POLARITY	TERMINALS 1,4,&7 SHALL BE OF LIKE POLARITY.
PHASE SHIFT	WITH 26 VOLTS, 800 CPS APPLIED (1-2) THE PHASE SHIFT SHALL BE: V(4-5) WITH RESPECT TO INPUT VOLTAGE = 0.5° MAXIMUM WITH A 4.2K OHM LOAD (4-5) V(5-6) WITH RESPECT TO INPUT VOLTAGE = 0.5° MAXIMUM WITH A 4.2K OHM LOAD (5-6). LOADS ARE NON-SIMULTANEOUS.
DC RESISTANCE	R(1-2)=520 OHMS MAX, R(4-5)=35 OHMS MAX, R(5-6)=35 OHMS MAX R(1-3)=550 OHMS MAX, R(7-8)=620 OHMS MAX

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN W. KOLAR DATE 24 JUN 64
CHECKED RW Harold 26 JUN 64
APPROVAL G. Cushman 8 Dec '64
APPROVAL
NASA APPROVAL W J Rhine 12-8-64
MIT APPROVAL W Kupfer 8 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER, POWER, STEP-DOWN - 26 TO 8 CT VOLTS, 800 CPS, 1MW

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010725
SCALE
WT
SHEET 2 OF 2

1010725

4 3 2 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 14715	12-9-64	
A	REVISED PER TDRR 15767	2/2/65	WR

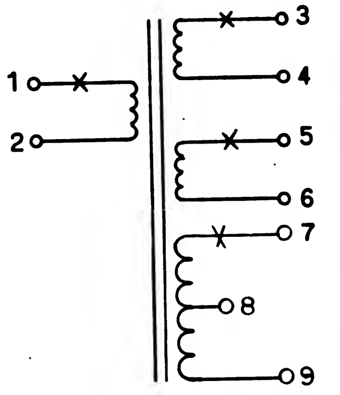
REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF MIL-T-27 WITH THE ADDITIONS AND EXCEPTIONS SPECIFIED HEREIN.
   - C. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404, CLASS 2.
   - D. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002047.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) LEADS: NICKEL WIRE PER ND 1015400. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
     - (2) MINIMUM MARKING: MARK PERMANENTLY AND LEGIBLY WITH NASA DRAWING NUMBER AND REVISION LETTER, MANUFACTURER'S NAME AND/OR SYMBOL, MANUFACTURER'S SERIAL AND/OR LOT CODE NUMBER AND LEAD IDENTIFICATION. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART AND PACKAGE. MARK IN ACCORDANCE WITH ND 1002019.
     - (3) DIMENSIONS: SEE FIGURE 1.
     - (4) COLOR: UNIT SHALL BE FINISHED WITH COLOR 514 OF ANA BULLETIN 157 (INSTRUMENT BLACK)
   - B. ELECTRICAL REQUIREMENTS - UNITS SHALL MEET ALL REQUIREMENTS OF TABLE 1.

3. DESIGN REQUIREMENTS:
   - A. THE UNIT SHALL MEET ALL REQUIREMENTS OF MIL-T-27 FOR GRADE 5, CLASS R, LIFE EXPECTANCY X, FAMILY 09 IN AN AMBIENT TEMPERATURE OF 85°C.
   - B. THE UNIT SHALL MEET ALL ELECTRICAL REQUIREMENTS EXCEPT WHERE NOTED, BEFORE, DURING AND AFTER THE FOLLOWING EXPOSURES:
     - (1) HIGH TEMPERATURE: 71°C OPERATING
     - (2) LOW TEMPERATURE: -18°C OPERATING
     - (3) VIBRATION: 10 TO 2000 CPS, 20 G (PER MIL-STD-202, METHOD 204A, CONDITION D)
     - (4) ALTITUDE (REDUCED PRESSURE): 96 HOURS AT A PRESSURE OF 10^{-4} MM OF MERCUTY.
     - (5) SHOCK: PER MIL-STD-810 PROCEDURE 1, EXCEPT USE 100 G
   - C. MAXIMUM WORKING VOLTAGE: 175 VOLTS
   - D. PRIMARY DC CURRENT: 2 MA MAX

VOLTAGE AND CURRENTS ARE RMS VALUES UNLESS OTHERWISE SPECIFIED



SCHEMATIC DIAGRAM

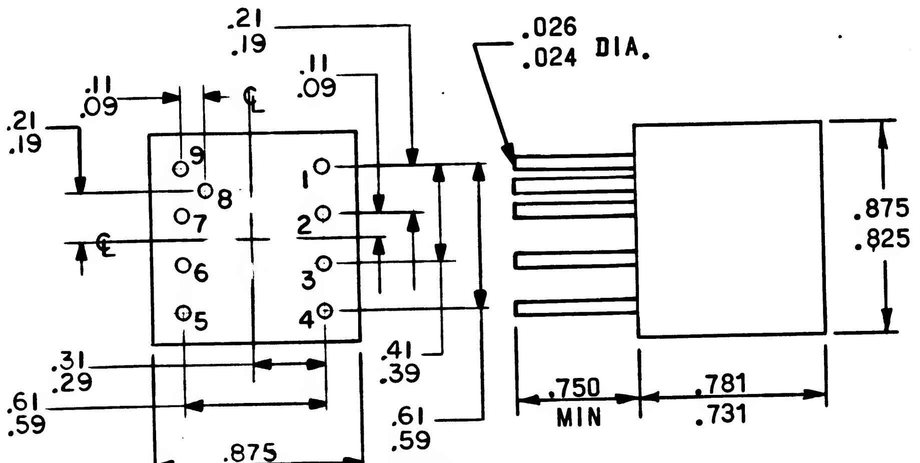


FIGURE 1

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN H. NORLING DATE 17 JUN 64
CHECKED R W Hessel 22 JUN 64
APPROVAL J. Cushman 8 Dec '64
APPROVAL
NASA APPROVAL W J Rhine 12-8-64
MIT APPROVAL W Gayfer 8 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER, POWER, ISOLATION-
5-5/5/12 VOLTS, 800 CPS, 10MW

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010726
SCALE NONE
WT
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 14715	12-8-64	
A	REVISED PER TDRR 15767	2/2/65	WR

REQUIREMENTS: (CONTINUED)

4. SPECIAL CONDITIONING BY MANUFACTURER (100%):
   A. TRANSFORMER SHALL BE TEMPERATURE CYCLED FOR 5 CYCLES PER MIL-STD-202 METHOD 102 EXCEPT THAT THE TEMPERATURES SHALL BE -55°C, +25°C AND +105°C AND EXPOSURE TIME SHALL BE 15 MINUTES AT EACH TEMPERATURE. DURING THE LAST CYCLE THE UNIT SHALL BE TESTED FOR CONTINUITY AT EACH OF THE AMBIENT CONDITIONS. AFTER STABILIZATION AT ROOM TEMPERATURE UNIT SHALL PASS NORMAL PRODUCTION TESTS.

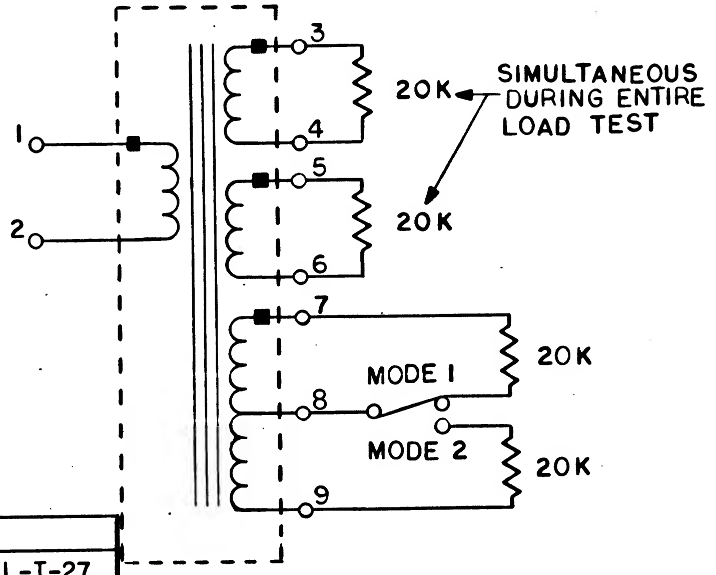


FIGURE 2

NOTE 1. LOADS ON 3-4 & 5-6 ARE SIMULTANEOUS DURING FULL LOAD + PHASE SHIFT CHECK IN MODE 1 & MODE 2.

TABLE I

INSPECTION TESTS	
TITLES IN PARAGRAPH COLUMN REFER TO PARAGRAPH TITLES IN SPECIFICATION MIL-T-27.	
PARAGRAPH	
SEALING	IMMERSE IN LIQUID AS INDICATED.
DIELECTRIC STRENGTH	APPLY 500 VOLTS (RMS) BETWEEN WINDINGS.
INSULATION RESISTANCE	10,000 MEGOHMS MINIMUM AT 25°C.
NO LOAD VOLTAGE	WITH AN INPUT OF 5.0 VOLTS, 800 CPS (1-2) THE NO LOAD OUTPUT VOLTAGE SHALL BE: A. V(3-4) = 5.1 VOLTS ±1% V (7-8) = 6.1 VOLTS ±1% B. V(5-6) = 5.1 VOLTS ±1% V (8-9) = 6.1 VOLTS ±1% C. $\frac{\text{VOLTAGES MEASURED IN A}}{\text{VOLTAGES MEASURED IN B}} = 1:1 \pm 1\%$
RATED LOAD	FULL LOAD VOLTAGE: WITH AN INPUT OF 5.0 VOLTS, 800 CPS TO TERMINALS 1 AND 2, AND CIRCUIT CONNECTED PER FIGURE 2, THE LOADED OUTPUTS ON TERMS. 3-4 AND 5-6 SHALL BE 5.0 ±1% VOLTS.. THE LOADED OUTPUTS ON TERMS. 7-8 & 8-9 SHALL BE 6.0 ±1%. (SEE NOTE 1)
DIRECT - CURRENT RESISTANCE	TERMINALS (1-2) = 52 OHMS MAX. TERMINALS (3-4) = 200 OHMS MAX. TERMINALS (5-6) = 210 OHMS MAX. TERMS. (7-8) = 240 MAX. TERMS. (8-9) = 240 MAX
POLARITY	TERMINALS 1,3,5, AND 7 SHALL BE OF LIKE POLARITY.
PHASE SHIFT	WITH 5.0 VOLTS, 800 CPS, 2 MADC APPLIED (1-2) AND LOADING PER FIGURE 2, NOTE 1, THE PHASE SHIFT OF VOLTAGE (3-4), (4-5) (7-8) AND (8-9) WITH RESPECT TO INPUT VOLTAGE SHALL BE 1° MAXIMUM EACH ON THE LOADED WINDINGS MODE 1 & 2.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO Contract NAS 9-497
DRAWN H. NORLING DATE 17 JUN 64
CHECKED R.W. Kessel 22 JUN 64
APPROVAL D. Cushman 8 Dec '64
APPROVAL
NASA APPROVAL W. J. Rhine 12-8-64
MIT APPROVAL W. Snyder 8 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER, POWER, ISOLATION-
5-5/5/12 VOLTS, 800 CPS, 10 MW

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010726
SCALE
WT
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

—	1010726

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 14715	12-8-64	

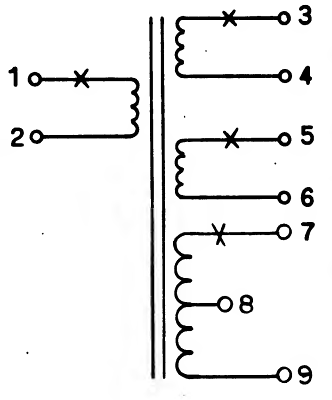
REQUIREMENTS:

1. GENERAL:
   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

   B. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF MIL-T-27 WITH THE ADDITIONS AND EXCEPTIONS SPECIFIED HEREIN.
   C. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404, CLASS 2.
   D. UNITS SHALL MEET THE QUALIFICATION REQUIREMENTS OF ND 1002047.

2. INSPECTION AND ACCEPTANCE:
   A. MECHANICAL REQUIREMENTS:
      (1) LEADS: NICKEL WIRE PER ND 1015400. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
      (2) MINIMUM MARKING: MARK PERMANENTLY AND LEGIBLY WITH NASA DRAWING NUMBER AND REVISION LETTER, MANUFACTURER'S NAME AND/OR SYMBOL, MANUFACTURER'S SERIAL AND/OR LOT CODE NUMBER AND LEAD IDENTIFICATION. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART AND PACKAGE. MARK IN ACCORDANCE WITH ND 1002019.
      (3) DIMENSIONS: SEE FIGURE 1.
      (4) COLOR: UNIT SHALL BE FINISHED WITH COLOR 514 OF ANA BULLETIN 157 (INSTRUMENT BLACK)
   B. ELECTRICAL REQUIREMENTS - UNITS SHALL MEET ALL REQUIREMENTS OF TABLE 1.
3. DESIGN REQUIREMENTS:
   A. THE UNIT SHALL MEET ALL REQUIREMENTS OF MIL-T-27 FOR GRADE 5, CLASS R, LIFE EXPECTANCY X, FAMILY 09 IN AN AMBIENT TEMPERATURE OF 85°C.
   B. THE UNIT SHALL MEET ALL ELECTRICAL REQUIREMENTS EXCEPT WHERE NOTED, BEFORE, DURING AND AFTER THE FOLLOWING EXPOSURES:
      (1) HIGH TEMPERATURE: 71°C OPERATING
      (2) LOW TEMPERATURE: -18°C OPERATING
      (3) VIBRATION: 10 TO 2000 CPS, 20 G (PER MIL-STD-202, METHOD 204A, CONDITION D)
      (4) ALTITUDE (REDUCED PRESSURE): 96 HOURS AT A PRESSURE OF 10^{-4} MM OF MERCURY.
      (5) SHOCK: PER MIL-STD-810 PROCEDURE 1, EXCEPT USE 100 G
   C. MAXIMUM WORKING VOLTAGE: 175 VOLTS
   D. PRIMARY DC CURRENT: 2 MA MAX

VOLTAGE AND CURRENTS ARE RMS VALUES UNLESS OTHERWISE SPECIFIED



SCHEMATIC DIAGRAM

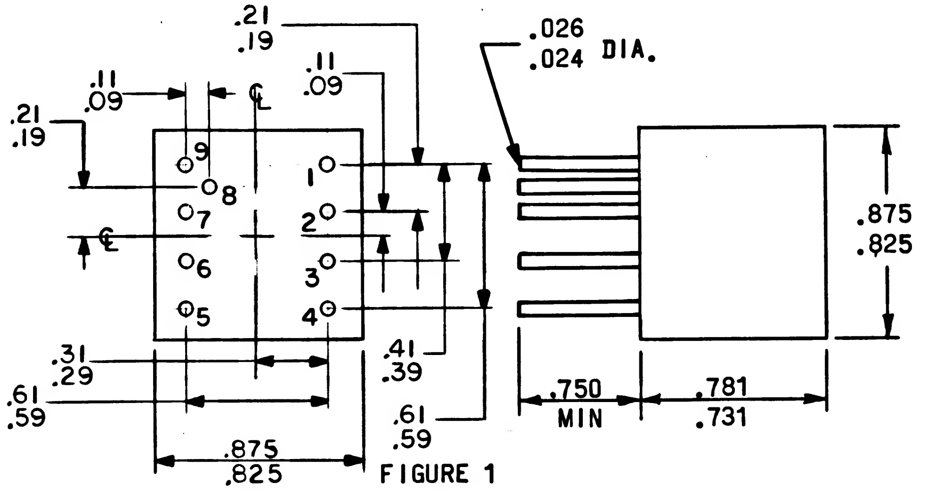


FIGURE 1

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG NO. Contract NAS 9-497

DRAWN H. NORLING DATE 17 JUN 64
CHECKED R W Hesil 22 JUN 64
APPROVAL J. Cushman 8 Dec '64
APPROVAL

NASA APPROVAL W J Rhine 12-8-64

MIT APPROVAL 8 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER, POWER, ISOLATION-
10-10/10/24 VOLTS, 800 CPS, 10MW

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010726
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 14715	12-8-64	

REQUIREMENTS: (CONTINUED)

4. SPECIAL CONDITIONING BY MANUFACTURER (100%):
   A. TRANSFORMER SHALL BE TEMPERATURE CYCLED FOR 5 CYCLES PER MIL-STD-202 METHOD 102 EXCEPT THAT THE TEMPERATURES SHALL BE -55°C, +25°C AND +105°C AND EXPOSURE TIME SHALL BE 15 MINUTES AT EACH TEMPERATURE. DURING THE LAST CYCLE THE UNIT SHALL BE TESTED FOR CONTINUITY AT EACH OF THE AMBIENT CONDITIONS. AFTER STABILIZATION AT ROOM TEMPERATURE UNIT SHALL PASS NORMAL PRODUCTION TESTS.

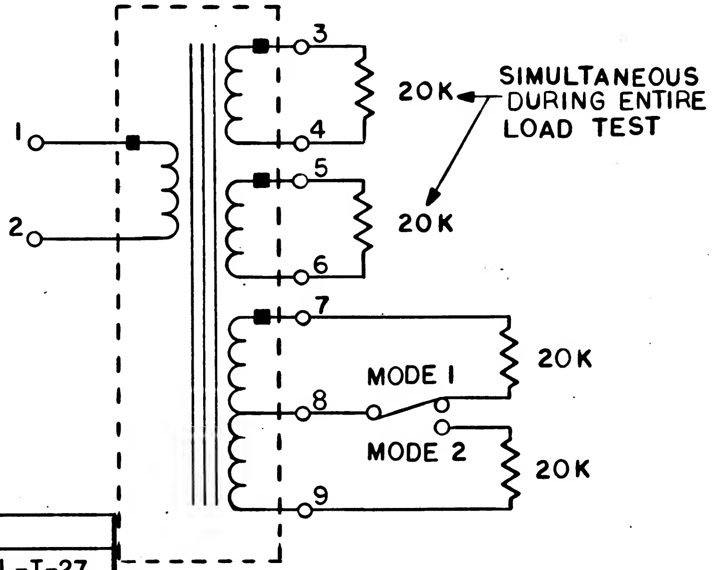


FIGURE 2

NOTE 1. LOADS ON 3-4 & 5-6 ARE SIMULTANEOUS DURING FULL LOAD + PHASE SHIFT CHECK IN MODE 1 & MODE 2.

TABLE I

INSPECTION TESTS

TITLES IN PARAGRAPH COLUMN REFER TO PARAGRAPH TITLES IN SPECIFICATION MIL-T-27.

PARAGRAPH	
SEALING	IMMERSE IN LIQUID AS INDICATED.
DIELECTRIC STRENGTH	APPLY 500 VOLTS (RMS) BETWEEN WINDINGS.
INSULATION RESISTANCE	10,000 MEGOHMS MINIMUM AT 25°C.
NO LOAD VOLTAGE	WITH AN INPUT OF 10.0 VOLTS, 800 CPS (1-2) THE NO LOAD OUTPUT VOLTAGE SHALL BE: A. V(3-4) = 10.3 VOLTS ±1% V (7-8)=12.2 VOLTS±1% B. V(5-6) = 10.3 VOLTS ±1% V (8-9)=12.2 VOLTS±1% C. $\frac{\text{VOLTAGES MEASURED IN A}}{\text{VOLTAGES MEASURED IN B}} = 1:1 \pm 1\%$
RATED LOAD	FULL LOAD VOLTAGE: WITH AN INPUT OF 10.0 VOLTS, 800 CPS TO TERMINALS 1 AND 2, AND CIRCUIT CONNECTED PER FIGURE 2, THE LOADED OUTPUTS ON TERMS. 3-4 AND 5-6 SHALL BE 10.0 ±1% VOLTS.. THE LOADED OUTPUTS ON TERMS. 7-8 & 8-9 SHALL BE 12.0 ±1%. (SEE NOTE 1)
DIRECT - CURRENT RESISTANCE	TERMINALS (1-2) = 52 OHMS MAX. TERMINALS (3-4) = 200 OHMS MAX. TERMINALS (5-6) = 210 OHMS MAX. TERMS. (7-8) = 240 MAX. TERMS. (8-9) = 240 MAX
POLARITY	TERMINALS 1,3,5, AND 7 SHALL BE OF LIKE POLARITY.
PHASE SHIFT	WITH 10.0 VOLTS, 800 CPS, 2 MADC APPLIED (1-2) AND LOADING PER FIGURE 2, NOTE 1, THE PHASE SHIFT OF VOLTAGE (3-4),(4-5) (7-8) AND (8-9) WITH RESPECT TO INPUT VOLTAGE SHALL BE 1° MAXIMUM EACH ON THE LOADED WINDINGS MODE 1 & 2.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN H. NORLING DATE 17 JUN 64
CHECKED RW Kuul 22 JUN 64
APPROVAL B. Cushman 8 Dec '64
APPROVAL
NASA APPROVAL W J Rhine 12-8-64
MIT APPROVAL 8 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER, POWER, ISOLATION-
10-10/10/24 VOLTS, 800 CPS, 10 MW

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010726
SCALE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010727 A

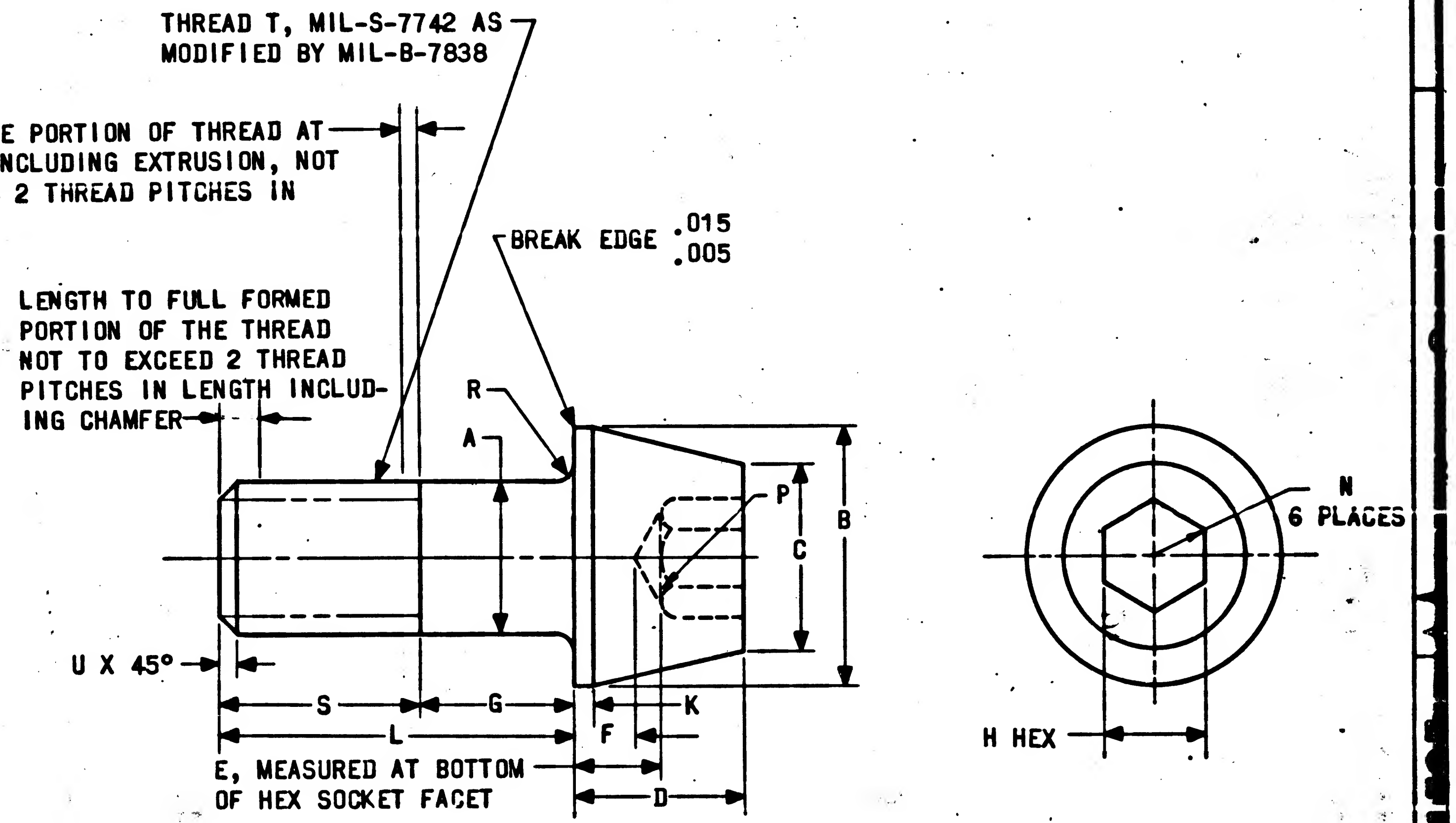
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 06414	1/8/64	WK
A	REVISED PER TDRR 12213	9/8/64	WK.

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. PARTS SHALL MEET THE REQUIREMENTS OF MIL-B-7838 AND MS 20004 THRU MS20024 EXCEPT FOR FINISH.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: ALLOY STEEL (160000 PSI)
     - (2) FINISH: ELECTROLESS NICKEL PLATE PER MIL-C-26074
     - (3) DIMENSIONS: AS SHOWN
     - (4) CONCENTRICITY:
       - a. DIMENSIONS A, B, AND C SHALL BE CONCENTRIC TO EACH OTHER WITHIN .006 TIR.
       - b. DIMENSIONS H AND C SHALL BE CONCENTRIC TO EACH OTHER WITHIN .008 TIR.
       - c. DIMENSION A AND THREAD PITCH DIAMETER SHALL BE CONCENTRIC TO EACH OTHER WITHIN .0045 TIR.
     - (5) MARKING:
       - a. PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME.
         - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER
         - DATE CODE, OR DATE OF MANUFACTURE.
       - b. MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. PER MIL-STD-129


THREAD T, MIL-S-7742 AS MODIFIED BY MIL-B-7838
INCOMPLETE PORTION OF THREAD AT RUN-OUT INCLUDING EXTRUSION, NOT TO EXCEED 2 THREAD PITCHES IN LENGTH.
BREAK EDGE .015 .005
LENGTH TO FULL FORMED PORTION OF THE THREAD NOT TO EXCEED 2 THREAD PITCHES IN LENGTH INCLUDING CHAMFER
R
A
P
C
B
N
6 PLACES
U X 45°
S
G
K
L
F
E, MEASURED AT BOTTOM OF HEX SOCKET FACET
D
H HEX

NASA DASH NUMBER	THREAD T	A DIA	B DIA	C DIA	D	E	F MIN	G	H	K	L	N RAD. MAX	P RAD.	R RAD.	S MIN (REF)	U	MIN TENSILE LOAD LBS.
-1	5/16-24 UNF-3A	.3117 .3102	.531 .521	.404 .384	.322 .302	.154 .134	.094	.760 .740	.2210 .2190	.073 .053	1.327 1.297	.010	.020 .010	.041 .031	.537	.063 .031	9820
-2	1/4 -28 UNF-3A	.2492 .2477	.438 .428	.352 .332	.260 .240	.122 .102	.068	.135 .115	.1900 .1880	.073 .053	.640 .610	.010	.020 .010	.041 .031	.475	.047 .015	6190

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN J. Patterson DATE 7 JAN 64
CHECKED M. Manning 8 JAN 64
APPROVAL
APPROVAL R. W. Dens 07 Feb '64
NASA APPROVAL W. J. Rhine 2-18-64
MIT APPROVAL W. Taylor 18 Feb 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BOLT - INTERNAL WRENCHING
(160,000 PSI)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. — SIZE C NASA DRAWING NO. 1010727
SCALE NONE WT SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010727 B

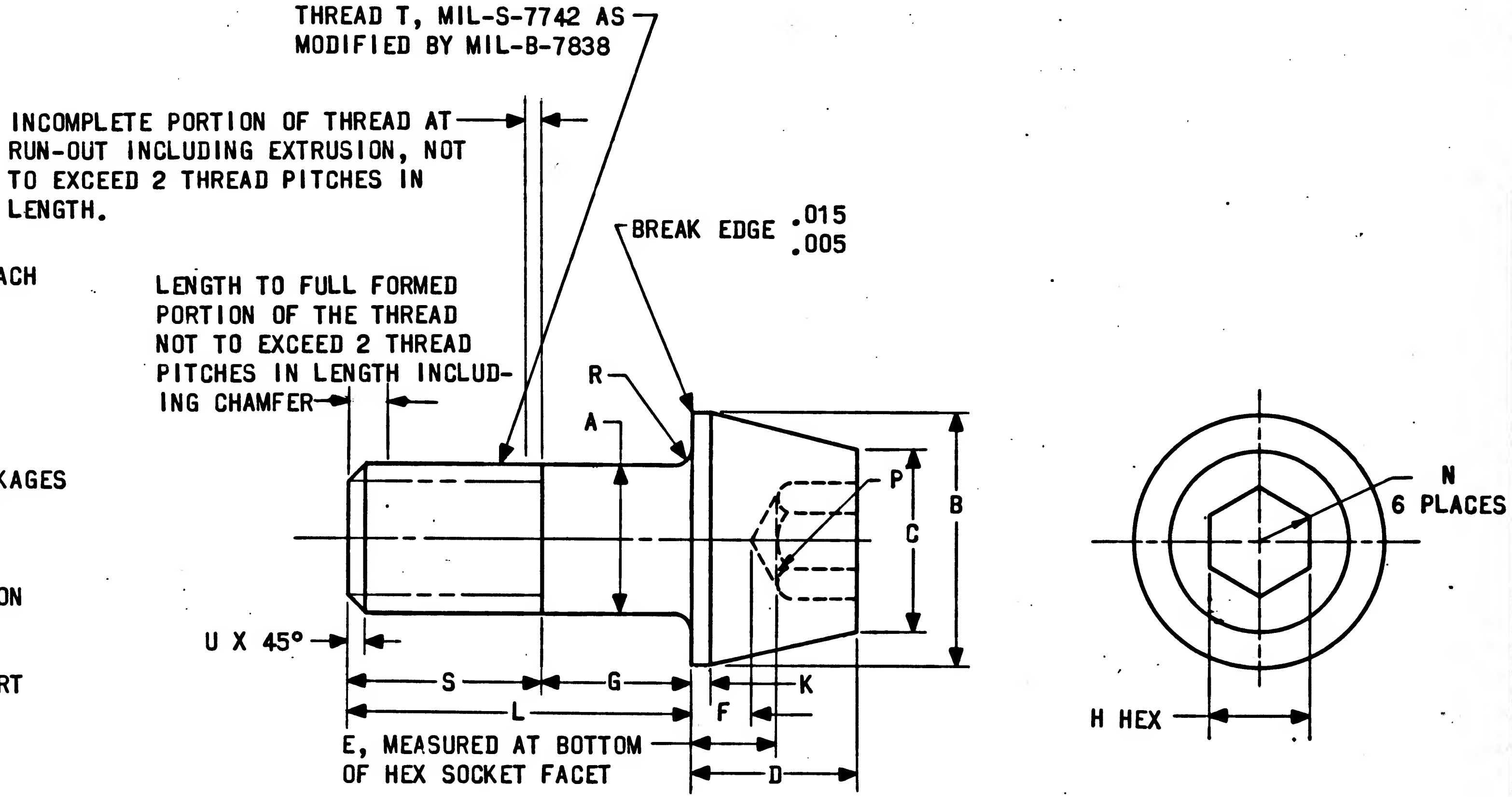
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 06414	2/18/64	WK
A	REVISED PER TDRR 12213	9/8/64	WK
B	REVISED PER TDRR 14883	12-22-64	WK

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. PARTS SHALL MEET THE REQUIREMENTS OF MIL-B-7838 AND MS 20004 THRU MS20024 EXCEPT FOR FINISH.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: ALLOY STEEL (160000 PSI)
     - (2) FINISH: ELECTROLESS NICKEL PLATE PER MIL-C-26074
     - (3) DIMENSIONS: AS SHOWN
     - (4) CONCENTRICITY:
       - a. DIMENSIONS A, B, AND C SHALL BE CONCENTRIC TO EACH OTHER WITHIN .006 TIR.
       - b. DIMENSIONS H AND C SHALL BE CONCENTRIC TO EACH OTHER WITHIN .008 TIR.
       - c. DIMENSION A AND THREAD PITCH DIAMETER SHALL BE CONCENTRIC TO EACH OTHER WITHIN .0045 TIR.
     - (5) MARKING:
       - a. PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME.
         - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER
         - DATE CODE, OR DATE OF MANUFACTURE.
       - b. MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. PER MIL-STD-129


THREAD T, MIL-S-7742 AS MODIFIED BY MIL-B-7838
INCOMPLETE PORTION OF THREAD AT RUN-OUT INCLUDING EXTRUSION, NOT TO EXCEED 2 THREAD PITCHES IN LENGTH.
BREAK EDGE .015 .005
LENGTH TO FULL FORMED PORTION OF THE THREAD NOT TO EXCEED 2 THREAD PITCHES IN LENGTH INCLUDING CHAMFER
R
A
P
B
C
N
6 PLACES
U X 45°
S
G
K
L
F
H HEX
E, MEASURED AT BOTTOM OF HEX SOCKET FACET
D

NASA DASH NUMBER	THREAD T	A DIA	B DIA	C DIA	D	E	F MIN	G	H	K	L	N RAD. MAX	P RAD.	R RAD.	S MIN (REF)	U	MIN TENSILE LOAD LBS.
-1	5/16-24 UNF-3A	.3117 .3102	.531 .521	.404 .384	.322 .302	.154 .134	.094	.760 .740	.2210 .2190	.073 .053	1.327 1.297	.010	.020 .010	.041 .031	.537	.063 .031	9820
-2	1/4 -28 UNF-3A	.2492 .2477	.438 .428	.352 .332	.260 .240	.122 .102	.068	.135 .115	.1900 .1880	.073 .053	.640 .610	.010	.020 .010	.041 .031	.475	.047 .015	6190
-3	1/4 -28 UNF-3A	.2492 .2477	.438 .428	.352 .332	.260 .240	.122 .102	.068	.135 .115	.1900 .1880	.073 .053	.765 .735	.010	.020 .010	.041 .031	.600	.047 .015	6190

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497

DRAWN J. Patterson DATE 7 JAN 64
CHECKED M. [illegible] 8 JAN 64
APPROVAL
APPROVAL R. W. [illegible] 17 Feb 64
NASA APPROVAL W. J. Rhine 2-18-64
MIT APPROVAL [illegible] 18 Feb 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BOLT - INTERNAL WRENCHING
(160,000 PSI)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010727
SCALE NONE
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

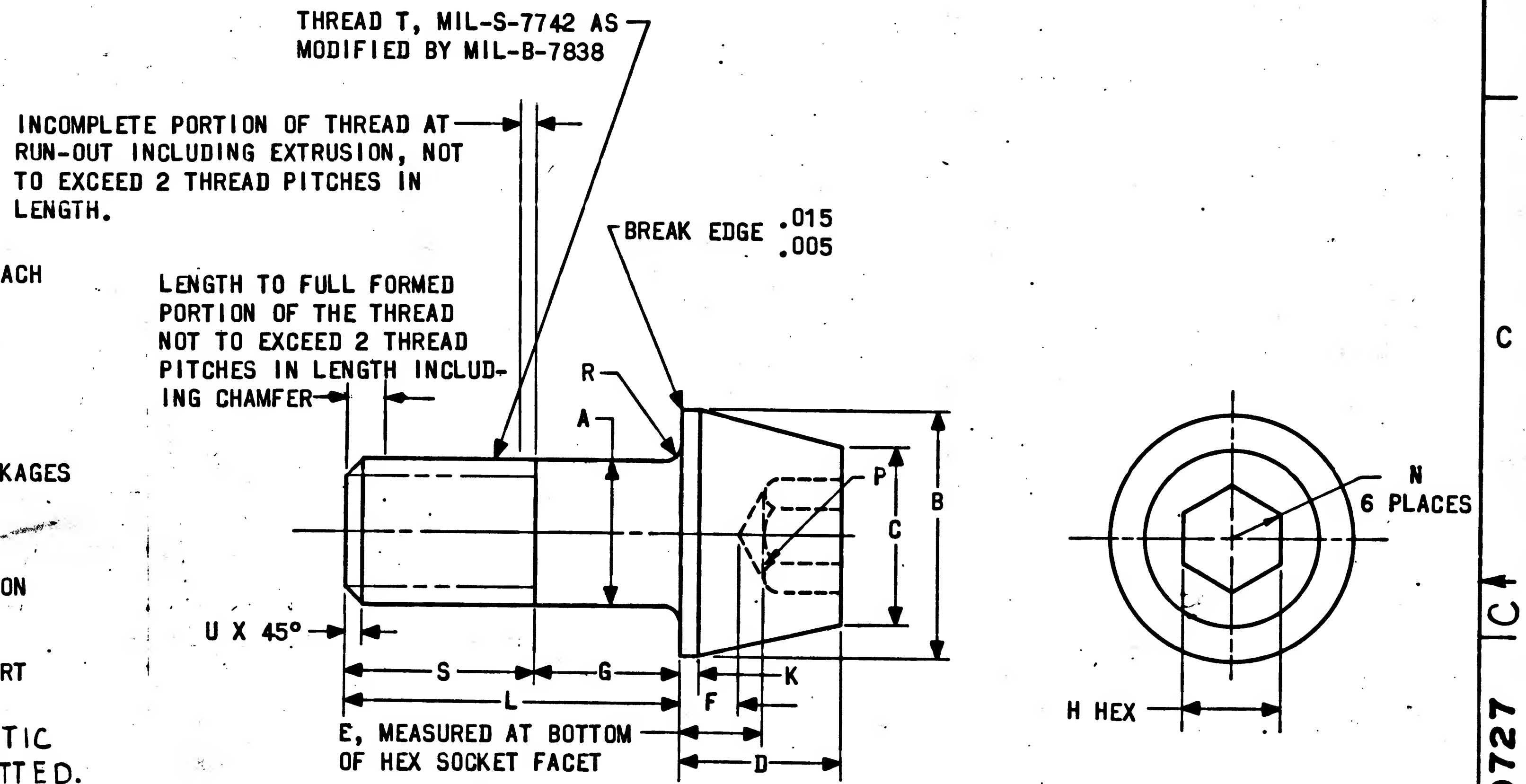
1010727 | C

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 06414	7/18/64	WK
A	REVISED PER TDRR 12213	9/8/64	WK
B	REVISED PER TDRR 14883	12-22-64	WK
C	REVISED PER TDRR 32225	12-10-66	WEB CP

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. PARTS SHALL MEET THE REQUIREMENTS OF MIL-B-7838 AND MS 20004 THRU MS20024 EXCEPT FOR FINISH.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: ALLOY STEEL (160000 PSI)
     - (2) FINISH: ELECTROLESS NICKEL PLATE PER MIL-C-26074
     - (3) DIMENSIONS: AS SHOWN
     - (4) CONCENTRICITY:
       - a. DIMENSIONS A, B, AND C SHALL BE CONCENTRIC TO EACH OTHER WITHIN .006 TIR.
       - b. DIMENSIONS H AND C SHALL BE CONCENTRIC TO EACH OTHER WITHIN .008 TIR.
       - c. DIMENSION A AND THREAD PITCH DIAMETER SHALL BE CONCENTRIC TO EACH OTHER WITHIN .0045 TIR.
     - (5) MARKING:
       - a. PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME.
         - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER
         - DATE CODE, OR DATE OF MANUFACTURE.
       - b. MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. PER MIL-STD-129
     - (6) PARTS SHALL BE TAGGED TO INDICATE MAGNETIC PARTICLE INSPECTION. DYE MARKING NOT PERMITTED.


THREAD T, MIL-S-7742 AS MODIFIED BY MIL-B-7838
INCOMPLETE PORTION OF THREAD AT RUN-OUT INCLUDING EXTRUSION, NOT TO EXCEED 2 THREAD PITCHES IN LENGTH.
BREAK EDGE .015 .005
LENGTH TO FULL FORMED PORTION OF THE THREAD NOT TO EXCEED 2 THREAD PITCHES IN LENGTH INCLUDING CHAMFER
R
A
P
C
B
N
6 PLACES
U X 45°
S
G
K
L
F
E, MEASURED AT BOTTOM OF HEX SOCKET FACET
D
H HEX

NASA DASH NUMBER	THREAD T	A DIA	B DIA	C DIA	D	E	F MIN	G	H	K	L	N RAD. MAX	P RAD.	R RAD.	S MIN (REF)	U	MIN TENSILE LOAD LBS.
-1	5/16-24 UNF-3A	.3117 .3102	.531 .521	.404 .384	.322 .302	.154 .134	.094	.760 .740	.2210 .2190	.073 .053	1.327 1.297	.010	.020 .010	.041 .031	.537	.063 .031	9820
-2	1/4 -28 UNF-3A	.2492 .2477	.438 .428	.352 .332	.260 .240	.122 .102	.068	.135 .115	.1900 .1880	.073 .053	.640 .610	.010	.020 .010	.041 .031	.475	.047 .015	6190
-3	1/4 -28 UNF-3A	.2492 .2477	.438 .428	.352 .332	.260 .240	.122 .102	.068	.135 .115	.1900 .1880	.073 .053	.765 .735	.010	.020 .010	.041 .031	.600	.047 .015	6190

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±
DECIMALS ±
ANGLES ±1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE REQUIREMENTS

HEAT TREATMENT
NONE

FINAL FINISH
SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
Contract NAS 9-497

DRAWN J. Patterson DATE 7 JAN 64
CHECKED 8 JAN 64
APPROVAL
APPROVAL R. W. [illegible] 17 Feb 64
NASA APPROVAL W. J. Rhine 2-18-64
MIT APPROVAL 18 Feb 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BOLT - INTERNAL WRENCHING
(160,000 PSI)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010727
SCALE NONE
WT
SHEET 1 OF 1

1010727 | C

1010727 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 06414	7/18/64	WK
A	REVISED PER TDRR 12213	9/8/64	WK
B	REVISED PER TDRR 14883	12-22-64	WK
C	REVISED PER TDRR 32225	12-10-66	WEB / CP

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. PARTS SHALL MEET THE REQUIREMENTS OF MIL-B-7838 AND MS 20004 THRU MS20024 EXCEPT FOR FINISH.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: ALLOY STEEL (160000 PSI)
     - (2) FINISH: ELECTROLESS NICKEL PLATE PER MIL-C-26074
     - (3) DIMENSIONS: AS SHOWN
     - (4) CONCENTRICITY:
       - a. DIMENSIONS A, B, AND C SHALL BE CONCENTRIC TO EACH OTHER WITHIN .006 TIR.
       - b. DIMENSIONS H AND C SHALL BE CONCENTRIC TO EACH OTHER WITHIN .008 TIR.
       - c. DIMENSION A AND THREAD PITCH DIAMETER SHALL BE CONCENTRIC TO EACH OTHER WITHIN .0045 TIR.
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         - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER
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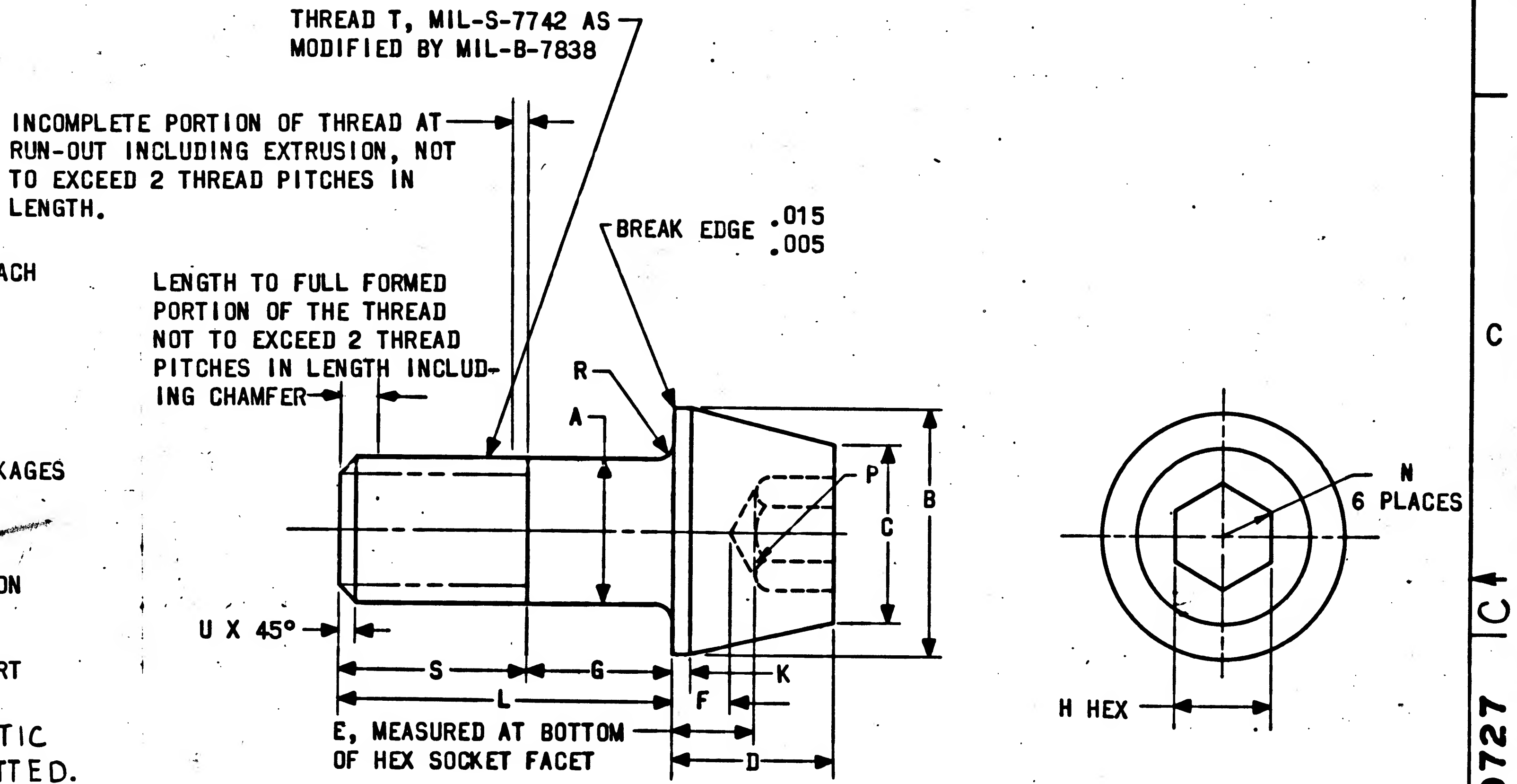
       - b. MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. PER MIL-STD-129
     - (6) PARTS SHALL BE TAGGED TO INDICATE MAGNETIC PARTICLE INSPECTION. DYE MARKING NOT PERMITTED.


THREAD T, MIL-S-7742 AS MODIFIED BY MIL-B-7838
INCOMPLETE PORTION OF THREAD AT RUN-OUT INCLUDING EXTRUSION, NOT TO EXCEED 2 THREAD PITCHES IN LENGTH.
BREAK EDGE .015 .005
LENGTH TO FULL FORMED PORTION OF THE THREAD NOT TO EXCEED 2 THREAD PITCHES IN LENGTH INCLUDING CHAMFER
R
A
P
B
C
U X 45°
S
G
K
L
F
E, MEASURED AT BOTTOM OF HEX SOCKET FACET
D
N 6 PLACES
H HEX

NASA DASH NUMBER	THREAD T	A DIA	B DIA	C DIA	D	E	F MIN	G	H	K	L	N RAD. MAX	P RAD.	R RAD.	S MIN (REF)	U	MIN TENSILE LOAD LBS.
-1	5/16-24 UNF-3A	.3117 .3102	.531 .521	.404 .384	.322 .302	.154 .134	.094	.760 .740	.2210 .2190	.073 .053	1.327 1.297	.010	.020 .010	.041 .031	.537	.063 .031	9820
-2	1/4 -28 UNF-3A	.2492 .2477	.438 .428	.352 .332	.260 .240	.122 .102	.068	.135 .115	.1900 .1880	.073 .053	.640 .610	.010	.020 .010	.041 .031	.475	.047 .015	6190
-3	1/4 -28 UNF-3A	.2492 .2477	.438 .428	.352 .332	.260 .240	.122 .102	.068	.135 .115	.1900 .1880	.073 .053	.765 .735	.010	.020 .010	.041 .031	.600	.047 .015	6190

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER

1010727 C

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±1°
DO NOT SCALE THIS DRAWING

MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497

DRAWN J. Patterson DATE 7 JAN 64
CHECKED M. Hamming 8 JAN 64
APPROVAL
APPROVAL R.W. Deas 17 Feb 64
NASA APPROVAL W. J. Rhine 2-18-64
MIT APPROVAL 18 Feb 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BOLT - INTERNAL WRENCHING
(160,000 PSI)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010727
SCALE NONE
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

— 1010727

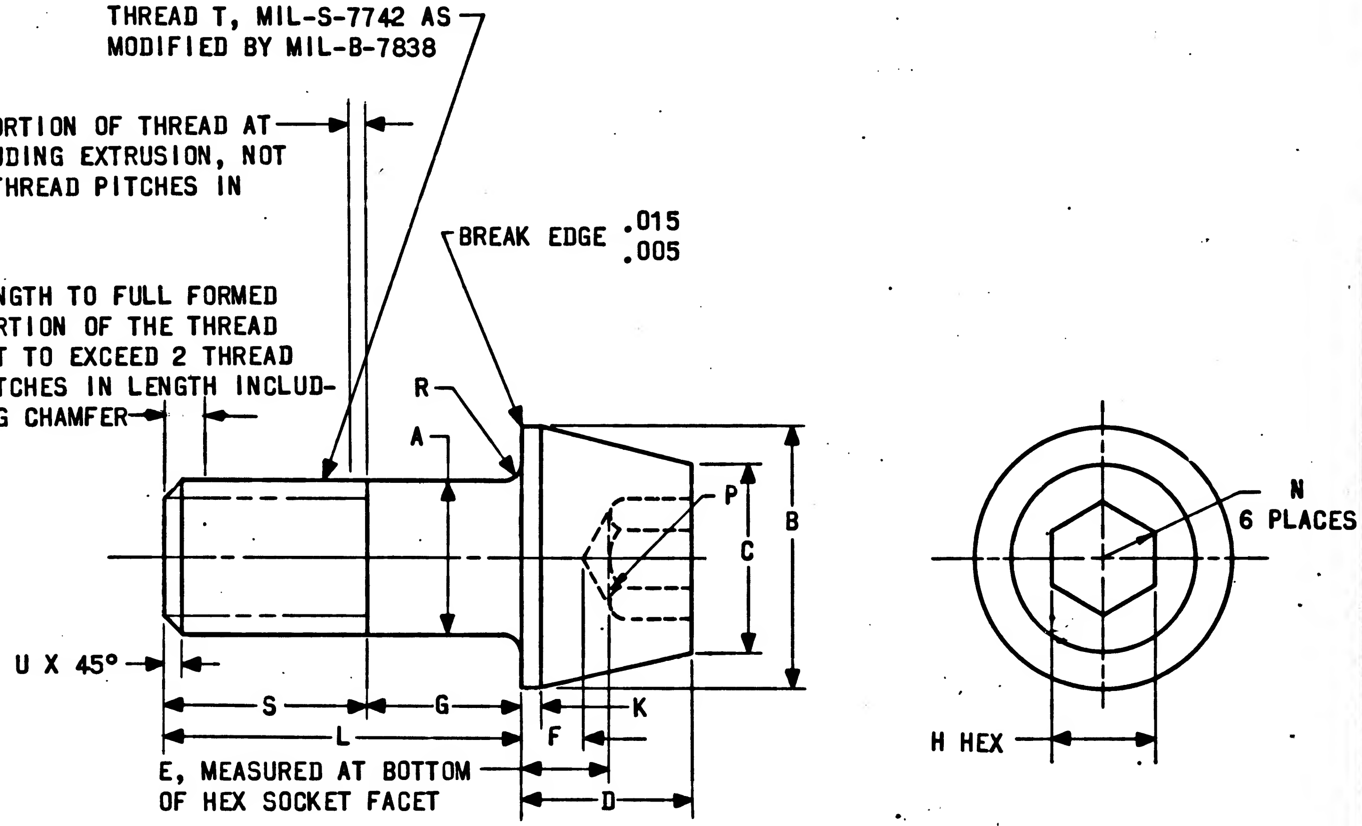
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 06414	2/18/64	WH

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. PARTS SHALL MEET THE REQUIREMENTS OF MIL-B-7838 AND MS 20005-12 EXCEPT FOR FINISH.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: ALLOY STEEL (160000 PSI)
     - (2) FINISH: ELECTROLESS NICKEL PLATE PER MIL-C-26074
     - (3) DIMENSIONS: AS SHOWN
     - (4) CONCENTRICITY:
       - a. DIMENSIONS A, B, AND C SHALL BE CONCENTRIC TO EACH OTHER WITHIN .006 TIR.
       - b. DIMENSIONS H AND C SHALL BE CONCENTRIC TO EACH OTHER WITHIN .008 TIR.
       - c. DIMENSION A AND THREAD PITCH DIAMETER SHALL BE CONCENTRIC TO EACH OTHER WITHIN .0045 TIR.
     - (5) MARKING:
       - a. PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME.
         - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER
         - DATE CODE, OR DATE OF MANUFACTURE.
       - b. MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

3. *DESIGN REQUIREMENTS*:
   - *A. MINIMUM TENSILE LOAD*: 9,820 *LBS.*


THREAD T, MIL-S-7742 AS MODIFIED BY MIL-B-7838

INCOMPLETE PORTION OF THREAD AT RUN-OUT INCLUDING EXTRUSION, NOT TO EXCEED 2 THREAD PITCHES IN LENGTH.

BREAK EDGE .015 .005

LENGTH TO FULL FORMED PORTION OF THE THREAD NOT TO EXCEED 2 THREAD PITCHES IN LENGTH INCLUDING CHAMFER

E, MEASURED AT BOTTOM OF HEX SOCKET FACET

N 6 PLACES

H HEX

NASA DASH NUMBER	THREAD T	A DIA	B DIA	C DIA	D	E	F MIN	G	H	K	L	N RAD. MAX	P RAD.	R RAD.	S MIN (REF)	U
-1	5/16-24 UNF-3A	.3117 .3102	.531 .521	.404 .384	.322 .302	.154 .134	.094	.760 .740	.2210 .2190	.073 .053	1.322 1.302	.010	.020 .010	.041 .031	.537	.063 .031

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: SEE REQUIREMENTS

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN J. Patterson DATE 7 JAN 64
CHECKED M. Namney 8 JAN 64
APPROVAL
APPROVAL R.W. Deas 17 Feb 64
NASA APPROVAL W. J. Rhine 2-18-64
MIT APPROVAL 18 Feb 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BOLT - INTERNAL WRENCHING
(160,000 PSI)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010727
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010728 B

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

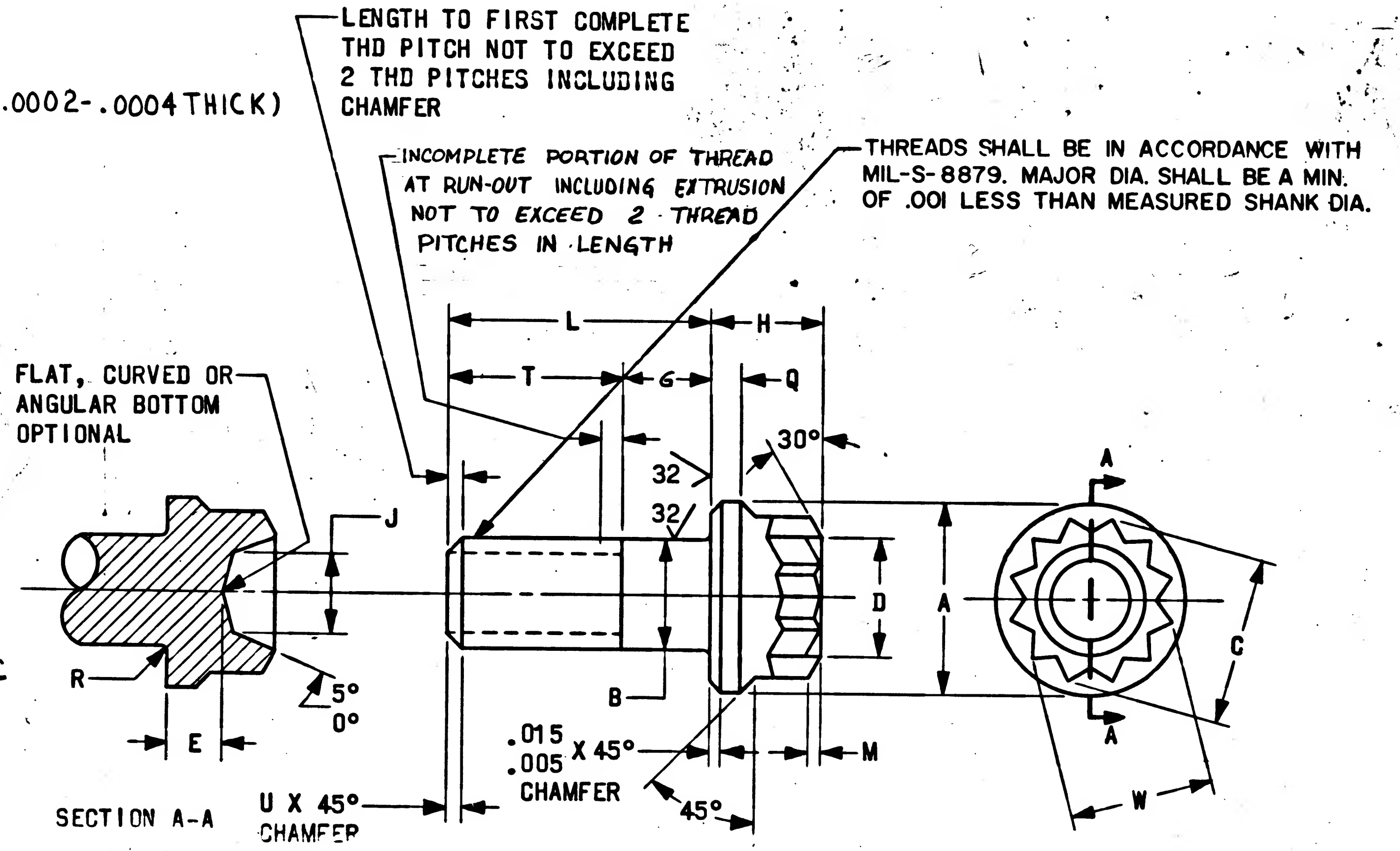
REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 06414	2/18/64	wk.
A	REVISED PER TDRR 16345	2/17/65	wk
B	REVISED PER TDRR 32226	12-10-66	WRB CP

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. PARTS SHALL MEET THE REQUIREMENTS OF MIL-B-8831 AND MS21250 EXCEPT FOR LENGTH AND FINISH.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: ALLOY STEEL (180000 PSI) PER MIL-B-8831
     - (2) FINISH: ELECTROLESS NICKEL PLATE PER MIL-C-26074 (.0002-.0004 THICK)
     - (3) DIMENSIONS: AS SHOWN
     - (4) CONCENTRICITY:
       - a. DIMENSIONS A, B, AND J SHALL BE CONCENTRIC TO EACH OTHER WITHIN .006 TIR.
       - b. DIMENSIONS W AND J SHALL BE CONCENTRIC TO EACH OTHER WITHIN .005 TIR.
       - c. DIMENSION B AND THREAD PITCH DIAMETER SHALL BE CONCENTRIC TO EACH OTHER WITHIN .0045 TIR.
     - (5) MARKING:
       - a. PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED "PER MIL-STD-129" WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME.
         - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER.
         - DATE CODE, OR DATE OF MANUFACTURE.
       - b. MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.
     - (6) "PARTS SHALL BE TAGGED TO INDICATE MAGNETIC PARTICLE INSPECTION. DYE MARKING NOT PERMITTED."


LENGTH TO FIRST COMPLETE THD PITCH NOT TO EXCEED 2 THD PITCHES INCLUDING CHAMFER
INCOMPLETE PORTION OF THREAD AT RUN-OUT INCLUDING EXTRUSION NOT TO EXCEED 2 THREAD PITCHES IN LENGTH
THREADS SHALL BE IN ACCORDANCE WITH MIL-S-8879. MAJOR DIA. SHALL BE A MIN. OF .001 LESS THAN MEASURED SHANK DIA.
FLAT, CURVED OR ANGULAR BOTTOM OPTIONAL
L
H
T
G
Q
30°
32
32
J
A
D
A
C
A
R
5°
0°
E
B
.015
.005 X 45°
CHAMFER
M
45°
W
SECTION A-A
U X 45°
CHAMFER

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN Bender DATE 7-JAN-64
CHECKED Peterson 8 JAN 64
APPROVAL
APPROVAL R.W. [illegible] 1 Feb '64
NASA APPROVAL W. J. Rhine 2-18-64
MIT APPROVAL W [illegible] 2 Feb 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BOLT, 12 POINT, EXTERNAL WRENCHING
(180000 PSI)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. — SIZE C NASA DRAWING NO. 1010728
SCALE NONE WT SHEET 1 OF 2

1010728 B

1010728 B

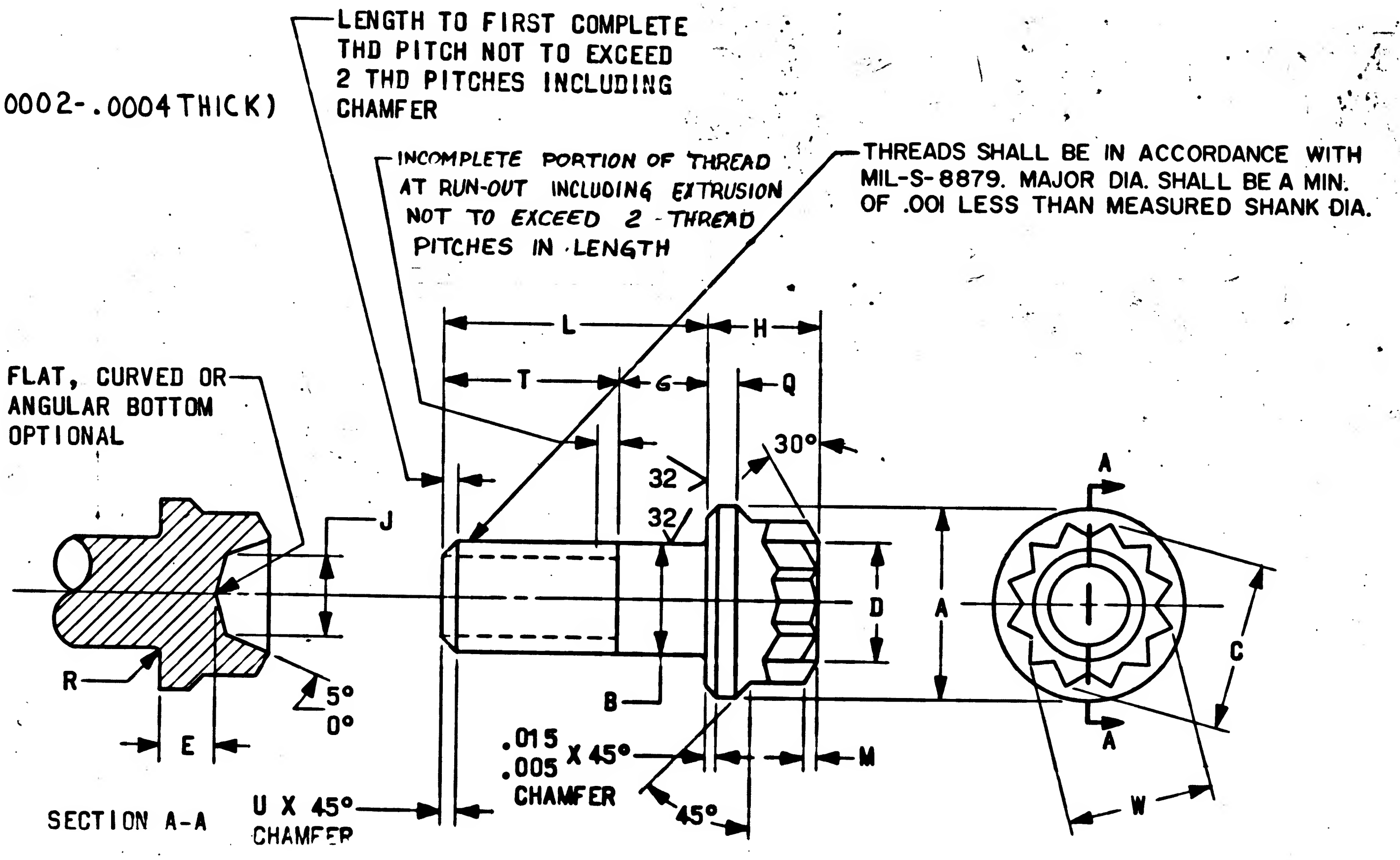
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR	2/18/64	
A	REVISED PER TDRR 16345	2/17/65	
B	REVISED PER TDRR 32226	12-10-66	

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. PARTS SHALL MEET THE REQUIREMENTS OF MIL-B-8831 AND MS21250 EXCEPT FOR LENGTH AND FINISH.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: ALLOY STEEL (180000 PSI) PER MIL-B-8831
     - (2) FINISH: ELECTROLESS NICKEL PLATE PER MIL-C-26074 (.0002-.0004 THICK)
     - (3) DIMENSIONS: AS SHOWN
     - (4) CONCENTRICITY:
       - a. DIMENSIONS A, B, AND J SHALL BE CONCENTRIC TO EACH OTHER WITHIN .006 TIR.
       - b. DIMENSIONS W AND J SHALL BE CONCENTRIC TO EACH OTHER WITHIN .005 TIR.
       - c. DIMENSION B AND THREAD PITCH DIAMETER SHALL BE CONCENTRIC TO EACH OTHER WITHIN .0045 TIR.
     - (5) MARKING:
       - a. PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED "PER MIL-STD-129" WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME.
         - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER.
         - DATE CODE, OR DATE OF MANUFACTURE.
       - b. MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.
     - (6) "PARTS SHALL BE TAGGED TO INDICATE MAGNETIC PARTICLE INSPECTION. DYE MARKING NOT PERMITTED."



LENGTH TO FIRST COMPLETE THD PITCH NOT TO EXCEED 2 THD PITCHES INCLUDING CHAMFER
INCOMPLETE PORTION OF THREAD AT RUN-OUT INCLUDING EXTRUSION NOT TO EXCEED 2 - THREAD PITCHES IN LENGTH
THREADS SHALL BE IN ACCORDANCE WITH MIL-S-8879. MAJOR DIA. SHALL BE A MIN. OF .001 LESS THAN MEASURED SHANK DIA.
FLAT, CURVED OR ANGULAR BOTTOM OPTIONAL
L
H
T
G
Q
30°
32
32
J
A
A
A
D
C
R
5°
0°
E
SECTION A-A
U X 45° CHAMFER
B
.015
.005 X 45° CHAMFER
45°
M
W

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH SEE REQUIREMENTS

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO Contract NAS 9-497
DRAWN Bender DATE 7-JAN-64
CHECKED Peterson 8 JAN 64
APPROVAL
APPROVAL R.W. [illegible] 17 Feb 64
NASA APPROVAL W. J. Rhine 2-18-64
MIT APPROVAL [illegible] F 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BOLT, 12 POINT, EXTERNAL WRENCHING
(180000 PSI)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. — SIZE C NASA DRAWING NO. 1010728
SCALE NONE WT SHEET 1 OF 2

1010728 B

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

NASA DASH NO.	THREAD SIZE	A DIA	B DIA	C MIN	D DIA	E MIN	H	J	L	M	Q	R	T MIN (REF)	U	W	G	MINIMUM TENSILE LOAD
-1	5/16 -24 UNF-3A	.531 .521	.312 .311	.419	.375 .360	.162	.358 .338	.225 .185	.760 .740	.080 .060	.092 .072	.041 .031	.579	.063 .031	.376 .367	.160 .140	11,400
-2	5/16 -24 UNF-3A	.531 .521	.312 .311	.419	.375 .360	.162	.358 .338	.225 .185	2.109 2.089	.080 .060	.092 .072	.041 .031	.579	.063 .031	.376 .367	1.510 1.490	11,400
-3	1/4 -28 UNF-3A	.438 .428	.250 .249	.347	.312 .297	.135	.310 .290	.190 .150	2.272 2.252	.072 .052	.079 .059	.041 .031	.492	.047 .015	.313 .304	1.760 1.740	7,190
-4	1/4 -28 UNF-3A	.438 .428	.250 .249	.347	.312 .297	.135	.310 .290	.190 .150	2.397 2.377	.072 .052	.079 .059	.041 .031	.492	.047 .015	,313 .304	1.885 1.865	7,190

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		THIS SHEET ADDED PER TDRR 16345			2/17/65	WR
B		REVISED PER TDRR 32226	WRB	CP	12-10-66	

(A) THIS SHEET ADDED

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Addario Jr. 10 Feb 65
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BOLT, 12 POINT, EXTERNAL
WRENCHING (18000 PSI)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
DRAWING NO. 1010728
SCALE
SHEET 2 OF 2

1010728 B

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		THIS SHEET ADDED PER TDRR 16345			2/17/65	WR
B		REVISED PER TDRR 32226	WRB	CP	12-10-66	

NASA DASH NO.	THREAD SIZE	A DIA	B DIA	C MIN	D DIA	E MIN	H	J	L	M	Q	R	T MIN (REF)	U	W	G	MINIMUM TENSILE LOAD
-1	5/16 -24 UNF-3A	.531 .521	.312 .311	.419	.375 .360	.162	.358 .338	.225 .185	.760 .740	.080 .060	.092 .072	.041 .031	.579	.063 .031	.376 .367	.160 .140	11,400
-2	5/16 -24 UNF-3A	.531 .521	.312 .311	.419	.375 .360	.162	.358 .338	.225 .185	2.109 2.089	.080 .060	.092 .072	.041 .031	.579	.063 .031	.376 .367	1.510 1.490	11,400
-3	1/4 -28 UNF-3A	.438 .428	.250 .249	.347	.312 .297	.135	.310 .290	.190 .150	2.272 2.252	.072 .052	.079 .059	.041 .031	.492	.047 .015	.313 .304	1.760 1.740	7,190
-4	1/4 -28 UNF-3A	.438 .428	.250 .249	.347	.312 .297	.135	.310 .290	.190 .150	2.397 2.377	.072 .052	.079 .059	.041 .031	.492	.047 .015	,313 .304	1.885 1.865	7,190

1010728 B

(A) THIS SHEET ADDED

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN A. Addario Jr. 10 Feb 65
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

BOLT, 12 POINT, EXTERNAL
WRENCHING (18000 PSI)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
DRAWING NO. 1010728
SCALE
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

—	1010728

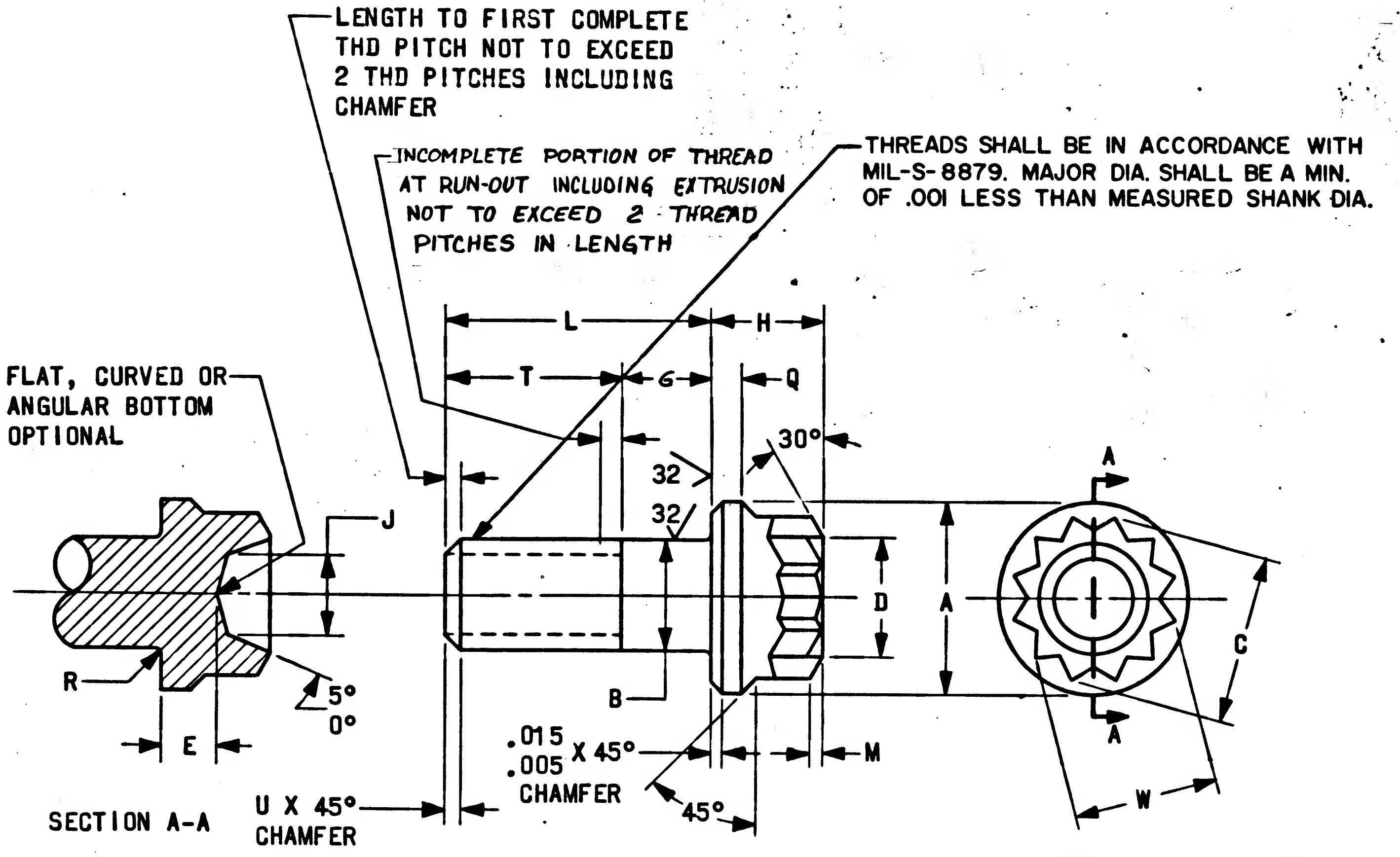
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 06414	2/18/64	wk.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
   - C. PARTS SHALL MEET THE REQUIREMENTS OF MIL-B-8831 AND MS21250 EXCEPT FOR LENGTH AND FINISH.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: ALLOY STEEL (180000 PSI)
     - (2) FINISH: ELECTROLESS NICKEL PLATE PER MIL-C-26074
     - (3) DIMENSIONS: AS SHOWN
     - (4) CONCENTRICITY:
       - a. DIMENSIONS A, B, AND J SHALL BE CONCENTRIC TO EACH OTHER WITHIN .006 TIR.
       - b. DIMENSIONS W AND J SHALL BE CONCENTRIC TO EACH OTHER WITHIN .005 TIR.
       - c. DIMENSION B AND THREAD PITCH DIAMETER SHALL BE CONCENTRIC TO EACH OTHER WITHIN .0045 TIR.
     - (5) MARKING:
       - a. PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
         - SUPPLIER'S NAME.
         - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER.
         - DATE CODE, OR DATE OF MANUFACTURE.
       - b. MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

3. DESIGN REQUIREMENTS:
   - A. MINIMUM TENSILE LOAD: 11,400 LBS.


LENGTH TO FIRST COMPLETE THD PITCH NOT TO EXCEED 2 THD PITCHES INCLUDING CHAMFER
INCOMPLETE PORTION OF THREAD AT RUN-OUT INCLUDING EXTRUSION NOT TO EXCEED 2 THREAD PITCHES IN LENGTH
THREADS SHALL BE IN ACCORDANCE WITH MIL-S-8879. MAJOR DIA. SHALL BE A MIN. OF .001 LESS THAN MEASURED SHANK DIA.
FLAT, CURVED OR ANGULAR BOTTOM OPTIONAL
L
H
T
G
Q
30°
32
32
A
A
J
D
A
C
R
5°
0°
B
E
.015
.005 X 45°
CHAMFER
M
45°
W
SECTION A-A
U X 45°
CHAMFER

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER

NASA DASH NUMBER	THREAD SIZE	A DIA	B DIA	C MIN	D DIA	E MIN	H	J	L	M	Q	R	T MIN (REF)	U	W	G
-1	5/16-24 UNF-3A	.531 .521	.312 .311	.419	.375 .360	.162	.358 .338	.225 .185	.760 .740	.080 .060	.092 .072	.041 .031	.579	.063 .031	.376 .367	.160 .140

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: SEE REQUIREMENTS

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN Bender DATE 7-JAN-64
CHECKED Peterson 8 JAN 64
APPROVAL
APPROVAL R.W. Gross 17 Feb '64
NASA APPROVAL W. J. Rhine 2-18-64
MIT APPROVAL W Kupfer 18 Feb 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BOLT, 12 POINT, EXTERNAL WRENCHING
(180000 PSI)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1010728
SCALE NONE
WT
SHEET 1 OF 1

1010728

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

— 1010729

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 07476		

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWINGS, SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATIONS ND 1015404, CLASS 3.
   - C. EACH UNIT AND SHIPPING CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, LOT NUMBER, NET CONTENTS, DATE OF MANUFACTURE AND EXPIRATION DATE FOR MATERIAL STORED IN UNOPENED CONTAINERS.

2. ACCEPTANCE AND INSPECTION:
   - A. MATERIAL - EPOXY-BUTADIENE RESIN, PIGMENTS, EXTENDER PIGMENTS, TINT COLORS AND SOLVENTS FORMULATED IN PROPER PROPORTION NECESSARY TO MEET THE REQUIREMENTS OF THIS SPECIFICATION. THE MATERIAL SHALL NOT CONTAIN DRYING OILS OR CELLULOSE MATERIALS.
   - B. PHYSICAL PROPERTIES - WHEN TESTED AS SPECIFIED THE MATERIAL SHALL COMPLY WITH THE REQUIREMENTS LISTED IN TABLE I.

TABLE I

PROPERTY	TEST METHOD	REQUIREMENT		
		1010729-1	1010729-2	1010729-3
SP.GR. 25/25C	ASTM-D-1298	1.1760 *	1.1760 *	1.1880 *
SOLIDS CONTENT	ASTM-D-1644	50 TO 53 PER CENT		
VISCOSITY	ASTM-D-1200	106 ± 6 SEC WITH NO. 4 FORD CUP		
FLASH POINT	ASTM-D-56	32° ± 1/2°F		

*±0.0240

   - C. THINNER - THE THINNER SHALL BE A MIXTURE OF HYDROCARBON SOLVENT AND KETONE SOLVENT OR ESTERS, ALCOHOLS AND ACETATES. THE THINNER SHALL BE 100% VOLATILE.
   - D. CURED MATERIAL
     - (1) PREPARATION AND APPLICATION
       - (a) THOROUGHLY STIR THE MATERIAL.
       - (b) ADD TEN ±0.1 PARTS BY WEIGHT CATALYST 1010730, TO EACH 100 ± 0.5 PARTS BY WEIGHT 1010729.
       - (c) THOROUGHLY STIR THE MIXTURE.
       - (d) ALLOW TO STAND AT 75° ± 5°F FOR 25 TO 35 MINUTES.
       - (e) ADJUST VISCOSITY TO 28 ± 2.5 SECONDS, FORD CUP NO. 4 USING THINNER SPECIFIED ABOVE.
       - (f) THE PREPARED MATERIAL SHALL BE APPLIED TO .024" X 2-1/2" X 5" ALUMINUM TEST PANELS CONFORMING TO QQ-M-411, O TEMPER, CHEMICALLY TREATED PER MIL-C-5541. APPLICATION SHALL BE ACCOMPLISHED BY SPRAYING IN A CRISS CROSS PATTERN TO A DRY FILM THICKNESS OF .002 TO .003 INCH.

—	—	—
SHEET 1	SHEET 2	SHEET 3
REVISION STATUS OF SHEETS		

— PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN DATE 7 FEB 64
CHECKED Ed Foster 11 FEB 64
APPROVAL A. Yelsey 4/7/64
APPROVAL
NASA APPROVAL 4/7/64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESIN, EPOXY BUTADIENE ENAMEL

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010729
SCALE NONE WT SHEET 1 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 07476		

REQUIREMENTS: (CONTINUED)

(g) AIR DRY AT ROOM TEMPERATURE (70° TO 80°F) FOR 15 TO 20 MINUTES.

(h) OVEN CURE AT 250°F, 30 TO 35 MINUTES.

(2) CONDITIONING - PRIOR TO TESTING, THE CURED SPECIMENS SHALL BE CONDITIONED AT 75° ± 5°F AND 50 ± 5 PERCENT RELATIVE HUMIDITY.

(3) WHEN PREPARED, APPLIED AND CONDITIONED AS SPECIFIED, THE CURED MATERIAL SHALL COMPLY WITH THE REQUIREMENTS SPECIFIED IN TABLE II.

TABLE II

PROPERTY	METHOD	REQUIREMENT		
		1010729-1	1010729-2	1010729-3
COLOR	FED-STD-595	36231	26440	37886
SPECULAR GLOSS	FED TEST METHOD STD NO. 141 METHOD 6101	2 TO 5	2 TO 5	2 TO 5

3. DESIGN REQUIREMENTS:

A. CURED MATERIAL - TEST SPECIMENS SHALL BE PREPARED AND PROCESSED IN ACCORDANCE WITH SECTION 2D UNLESS OTHERWISE SPECIFIED.

(1) FLEXIBILITY - WHEN TESTED IN ACCORDANCE WITH FEDERAL TEST METHOD STANDARD NO. 141, METHOD 6221 AT A TEMPERATURE OF 70° ± 5°F THE COATING SHALL NOT FLAKE, CRACK OR DISPLAY LACK OF ADHESION TO THE TEST PANEL WHEN BENT 180° AROUND A MANDREL HAVING A MAXIMUM DIAMETER OF 3/8 INCH.

(2) ABRASION RESISTANCE - THE WEAR INDEX SHALL BE A MAXIMUM OF 100 MG PER 1000 CYCLES WHEN TESTED IN ACCORDANCE WITH METHOD 6192 OF FEDERAL TEST METHOD STANDARD NO. 141. THE ABRASION TEST PLATES SHALL BE AS SPECIFIED IN METHOD 6192 EXCEPT THAT THEY SHALL BE FABRICATED FROM ALUMINUM OF ANY OF THE FOLLOWING TYPES, CHEMICALLY TREATED PER MIL-C-5541.

QQ-A-355-T3
QQ-A-318-H32 OR H34
QQ-A-327-T6

THE ABRASIVE WHEELS SHALL BE NO. C5-17 AND THE PRESSURE OF EACH WHEEL AGAINST THE TEST FILM SHALL BE 1000 GRAMS. THE ABRASIVE WHEELS SHALL BE DIAMOND DRESSED PRIOR TO TESTING EACH PANEL.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. Contract NAS 9-497
DRAWN J. Patterson DATE 7 FEB 64
CHECKED Ed Foster 11 FEB 64
APPROVAL A. Yelsey 4/7/64
APPROVAL
NASA APPROVAL 4/7/64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESIN, EPOXY BUTADIENE ENAMEL

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1010729
SCALE WT SHEET 2 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

–	1010729

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 07476		

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS: (CONTINUED)

(3) SCRATCH HARDNESS - THE CURED ENAMEL SHALL RESIST PERCEPTIBLE MARKING WHEN A 60° PYRAMIDAL DIAMOND STYLUS HAVING A RADIUS OF .002 TO .003 INCH AT ITS CONTACT POINT IS DRAWN OVER THE SURFACE OF THE COATED PANEL WITH AN APPLIED LOAD OF 100 GRAMS. AN APPLIED LOAD OF NOT LESS THAN 1000 GRAMS SHALL BE REQUIRED TO CUT THROUGH A .0025 INCH THICK COATING. DURING TEST, THE DIAMOND STYLUS SHALL BE POSITIONED IN SUCH A MANNER THAT ITS CENTERLINE IS PERPENDICULAR TO THE COATED PANEL AND TWO OPPOSITE EDGES OF ITS PYRAMIDAL SHAPE PARALLEL TO THE DIRECTION OF MOVEMENT.

(4) ADHESION - WHEN TESTED IN ACCORDANCE WITH FEDERAL TEST METHOD STANDARD NO. 141, METHOD 6304, THE CURED COATING SHALL NOT LIFT, CHIP OR FLAKE FROM THE TEST PANEL. REMOVAL OF ANY MATERIAL FROM THE TEST PANEL SHALL BE DUE TO CUTTING ACTION OF THE TEST KNIFE.

(5) THERMAL SHOCK RESISTANCE - THE COATING SHALL NOT SHOW EVIDENCE OF CRACKING, FLAKING, LOSS OF ADHESION, BLISTERING, CHARRING OR OTHER FAILURE AFTER A TEMPERATURE CHANGE FROM 350°F MINIMUM TO 32°F MAXIMUM IN 2 SECONDS.

(6) HUMIDITY TEST - WHEN TESTED IN ACCORDANCE WITH METHOD 6201 OF FEDERAL TEST METHOD STANDARD NO. 141, 95 TO 100% RELATIVE HUMIDITY AT 160° ± 8°F FOR A MINIMUM OF 240 HOURS THE CURED COATING SHALL NOT BLISTER, CHECK, CRACK, CRAZE OR SOFTEN AND THERE SHALL BE NO CORROSION OF THE SUBSTRATE. THE CHAMBER AIR SUPPLY SHALL NOT BE REPLENISHED DURING TEST.

(7) APPEARANCE - THE MATERIAL SHALL BE CAPABLE OF PROVIDING HIGH QUALITY COATINGS COMPLETE IN COVERAGE OF THE BASE COATING, UNIFORM IN APPEARANCE AND COLOR, FREE FROM BLISTERING BUBBLING, SMUDGING, VOIDS OR ANY DELETERIOUS DEFECTS.

B. POT LIFE - 8 HOURS MINIMUM AT 75° ± 5°F.

C. SHELF LIFE - THE MATERIAL SHALL HAVE A MINIMUM USABLE SHELF LIFE OF 6 MONTHS WHEN RECEIVED BY THE PURCHASER AND STORED AT 40°F TO 90°F IN UNOPENED CONTAINERS.

D. INTENDED USE - WHEN CATALYZED WITH 1010730 THIS MATERIAL IS INTENDED TO BE USED AS A LUSTERLESS ENAMEL, RESISTANT TO ABRASION, MARRING AND FLAKING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN J. Patterson DATE 7 FEB 64
CHECKED Ed Foster 11 FEB 64
APPROVAL
APPROVAL
NASA APPROVAL 4/7/64
MIT APPROVAL 4/7/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESIN, EPOXY BUTADIENE ENAMEL

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010729
SCALE
WT
SHEET 3 OF 3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 06581	2/25/64	

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) DIMENSIONS: AS SHOWN
     - (2) CONCENTRICITY:
       - (a) DIMENSIONS A AND B SHALL BE CONCENTRIC WITHIN "X" T.I.R.
       - (B) BODY AND PITCH DIAMETERS TO BE CONCENTRIC WITHIN "Y" T.I.R.
     - (3) MARKING:
       - (a) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION: SUPPLIER'S NAME; NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER; DATE CODE OR DATE OF MANUFACTURE.
       - (b) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

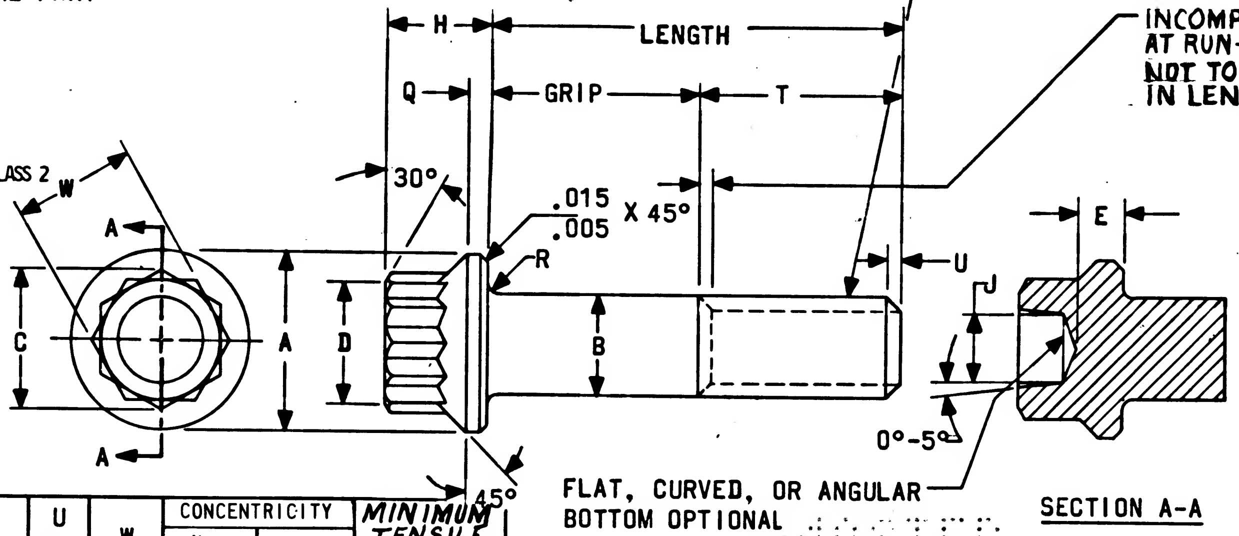
3. DESIGN REQUIREMENTS:
   - A. MATERIAL: ALLOY STEEL, (VASCO-JET MA)
   - B. FINISH: ELECTROLESS NICKEL PLATE PER MIL-C-26074, CLASS 2
   - C. MINIMUM TENSILE LOAD = SEE TABLE II.
   - D. MAGNAFLUX: PER MIL-I-6868
   - E. MECHANICAL PROPERTIES (LONGITUDINAL) AT ROOM TEMPERATURE
     - (1) SPECIMENS AUSTENITIZED BY HEATING TO 1975° F ± 25°, HOLDING AT HEAT FOR FIVE MINUTES, AND AIR COOLING TO ROOM TEMPERATURE, THEN TEMPERED THREE TIMES BY HEATING TO 1025°F ± 25°F, HOLDING AT HEAT FOR TWO HOURS, AND COOLING IN AIR; SHALL CONFORM TO THE REQUIREMENTS OF TABLE I.

TABLE I

HARDNESS ROCKWELL "C"	ULTIMATE TENSILE psi MIN.	YIELD 0.2% OFFSET psi MIN.	MIN. ELONG. IN 4D %	MIN. REDUCTION OF AREA %
56 - 58	300,000	240,000	7.0	20.0

THREADS SHALL BE IN ACCORDANCE WITH MIL-S-8879. MAJOR DIA SHALL BE A MIN OF .001 LESS THAN MEASURED SHANK DIA.

INCOMPLETE PORTION OF THREAD AT RUN-OUT INCLUDING EXTRUSION NOT TO EXCEED 2 THREAD PITCHES IN LENGTH.



FLAT, CURVED, OR ANGULAR BOTTOM OPTIONAL

SECTION A-A

MASTER

TABLE II

THREAD	A DIA	B DIA	C MIN	D DIA	E MIN	H	J	Q	R	T REF	U REF	W	CONCENTRICITY X	CONCENTRICITY Y	MINIMUM TENSILE LOAD LB.
1/4-28 UNF-3A	.475 .465	.2495 .2485	.347	.312 .297	.135	.264 .244	.190 .150	.052 .032	.041 .031	.517	.05	.313 .304	.005	.0045	11,600
5/16-24 UNF-3A	.585 .575	.3120 .3110	.419	.375 .360	.162	.329 .309	.225 .185	.060 .040	.041 .031	.633	.05	.376 .367	.006	.0045	18,400

SHEET	SHEET
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO
Contract NAS 9-497
DRAWN Patterson DATE 27 JAN 64
CHECKED Ed Foster 29 JAN 64
APPROVAL
APPROVAL R.W. Bus 11 Feb 64
NASA APPROVAL W. J. Rhine 2-25-64
MIT APPROVAL I. Halzel 2/25/64

MANNED SPACECRAFT CENTER
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BOLT, TENSION, EXTERNAL WRENCHING (300,000 PSI)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010732
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010732

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 06581	2/25/64	gm

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

TABLE III

NASA DASH NUMBER	THREAD	GRIP ±.010	LENGTH ±.015		NASA DASH NUMBER	THREAD	GRIP ±.010	LENGTH ±.015	
-1	1/4-28	.125	.642		-26	5/16-24	.250	.883	
-2		.250	.767		-27		.375	1.008	
-3		.375	.892		-28		.500	1.133	
-4		.500	1.017		-29		.625	1.258	
-5		.625	1.142		-30		.750	1.383	
-6		.750	1.267		-31		.875	1.508	
-7		.875	1.392		-32		1.000	1.633	
-8		1.000	1.517		-33		1.125	1.758	
-9		1.125	1.642		-34		1.250	1.883	
-10		1.250	1.767		-35		1.375	2.008	
-11		1.375	1.892		-36		1.500	2.133	
-12		1.500	2.017		-37		1.625	2.258	
-13		1.625	2.142		-38		1.750	2.383	
-14		1.750	2.267		-39		1.875	2.508	
-15		1.875	2.392		-40		2.000	2.633	
-16		2.000	2.517		-41		2.125	2.758	
-17		2.125	2.642		-42		2.250	2.883	
-18		2.250	2.767		-43		2.375	3.008	
-19		2.375	2.892		-44		2.500	3.133	
-20		2.500	3.017		-45		2.625	3.258	
-21		2.625	3.142		-46		2.750	3.383	
-22		2.750	3.267		-47		2.875	3.508	
-23		2.875	3.392		-48		3.000	3.633	
-24		3.000	3.517		-49		3.125	3.758	
-25		3.125	3.642		-50		3.250	3.883	

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. Contract NAS 9-497
DRAWN Patterson DATE 27 JAN 64
CHECKED Ed Foster 29 JAN 64
APPROVAL
APPROVAL R.W. Bass 11 Feb 64
NASA APPROVAL W. J. Rhine 2-25-64
MIT APPROVAL 2/25/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BOLT, TENSION, EXTERNAL WRENCHING (300,000 PSI)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010732
SCALE
WT
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

A 1010733

REVISIONS			08768
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 08768	5/26/64	WK.
A	REVISED PER TDRR 10368	10/24/64	WK

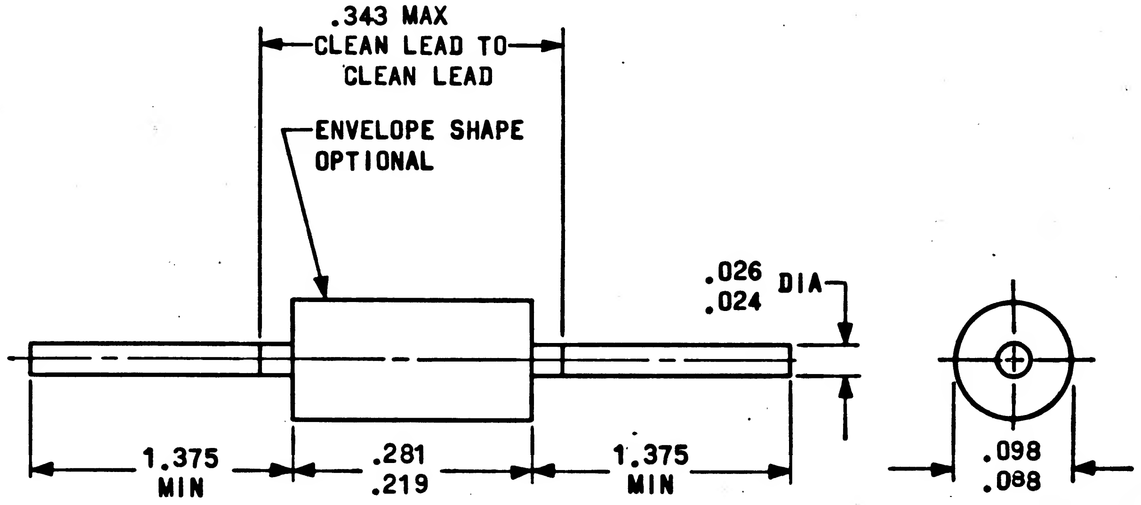
REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. UNITS SHALL MEET THE REQUIREMENTS OF MIL-R-10509 STYLE RN55, CHARACTERISTIC E, TOLERANCE B; EXCEPT AS SPECIFIED HEREIN.
   - C. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - D. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002057 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - E. UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH ND 1002129.

2. INSPECTION AND ACCEPTANCE:
   - A. ELECTRICAL REQUIREMENTS:
     - (1) RESISTANCE VALUES: PER TABLE
     - (2) RESISTANCE TOLERANCE: SEE TABLE
   - B. MECHANICAL REQUIREMENTS:
     - (1) MARKING: THE MANUFACTURER'S NAME OR SYMBOL (CAN BE CHARACTERISTIC COLOR), THE LAST THREE DIGITS OF THE NASA DRAWING NUMBER, DASH NUMBER, REVISION LETTER, AND SERIAL NUMBER, SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND1002019. THE MANUFACTURER'S PART OR TYPE NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND SHIPPING CONTAINERS SHALL CONTAIN THE NASA DRAWING NUMBER, THE DASH NUMBER AND THE REVISION LETTER.
     - (2) LEAD MATERIAL SHALL BE NICKEL PER ND 1015400. A CERTIFICATION OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
   - C. DIMENSIONS PER FIGURE.

3. DESIGN REQUIREMENTS:
   - A. PER MIL-R-10509 AS MODIFIED BY THIS DRAWING.
   - B. POWER RATING: 0.10 WATT AT +125°C DERATED LINEARLY TO 175°C.
   - C. TEMPERATURE COEFFICIENT: ± 25 PPM/°C (-55°C TO +175°C)
   - D. MAX CONTINUOUS WORKING VOLTAGE: 200 VOLTS
   - E. DIELECTRIC WITHSTANDING VOLTAGE: 750 VOLTS RMS

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. EACH UNIT SHALL BE BURNED IN FOR 100 HOURS AT RATED POWER AT 125°C. THE RESISTANCE CHANGE SHALL NOT BE MORE THAN 0.1% FROM INITIAL MEASURED VALUE, OR OUT OF INITIAL TOLERANCE, BEFORE AND AFTER BURN-IN. THE BURN-IN DATA SHALL BE INCLUDED WITH EACH SHIPMENT. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL RESISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS.



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE REQUIREMENTS
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN PATTERSON DATE 4-FEB-64
CHECKED FOSTER 6-FEB-64
APPROVAL D. B. Test 5/26/64
APPROVAL
NASA APPROVAL 5/26/64
MIT APPROVAL 26 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, FILM

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010733

SCALE NONE WT SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010733 A

REVISIONS		08768	
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 08768	5/26/64	WK.
A	REVISED PER TDRR 10368	6/29/64	WK.

TABLE I

DASH NUMBER	RESISTANCE (OHMS) ± 0.1%
1	97.41
2	97.70
3	196.8
4	399.3
5	409.5
6	8K
7	16K
8	27.06K
9	32K
10	65.33K
11	100K
12	25K
13	50K
14	475Ω
15	54.9K
16	866.9K
17	128.15K

TABLE II

DASH NUMBER	RESISTANCE (OHMS) ±1.0%
101	2K
102	2.6K
103	4K
104	8K
105	10K
106	11K
107	12K
108	13K
109	14K
110	15K
111	16K
112	17K
113	18K
114	19K
115	20K
116	75K
117	100K
118	150K
119	200K

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

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DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN J. Cowley DATE 22 MAY 64
CHECKED A. Marts 5-25-64
APPROVAL D. B. Fast 5-26-64
APPROVAL
NASA APPROVAL 5/26/64
MIT APPROVAL 26 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, FILM

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010733
SCALE	WT	SHEET 2 OF 2

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1010733 B

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 08768			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 08768	5/26/64	WK.
A	REVISED PER TDRR 10368	10/24/64	WK
B	REVISED PER TDRR 19132	5/26/65	WR

REQUIREMENTS:

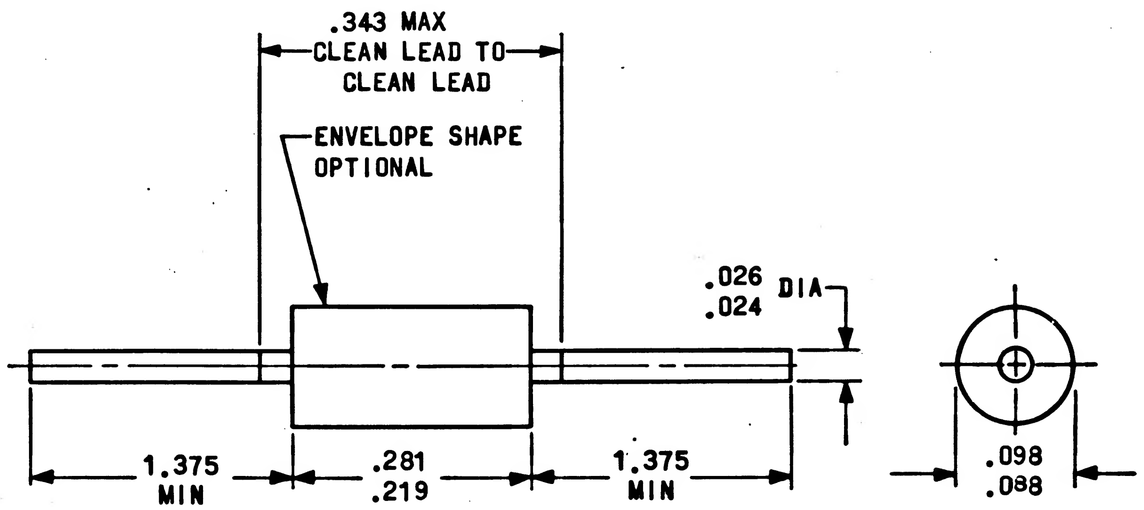
1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. UNITS SHALL MEET THE REQUIREMENTS OF MIL-R-10509 STYLE RN55, CHARACTERISTIC E, TOLERANCE B; EXCEPT AS SPECIFIED HEREIN.
   - C. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
   - D. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002057 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - E. UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH ND 1002129.

2. INSPECTION AND ACCEPTANCE:
   - A. ELECTRICAL REQUIREMENTS:
     - (1) RESISTANCE VALUES: PER TABLE
     - (2) RESISTANCE TOLERANCE: SEE TABLE
   - B. MECHANICAL REQUIREMENTS:
     - (1) MARKING: THE MANUFACTURER'S NAME OR SYMBOL (CAN BE CHARACTERISTIC COLOR), THE LAST THREE DIGITS OF THE NASA DRAWING NUMBER, DASH NUMBER, REVISION LETTER, AND SERIAL NUMBER, SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND1002019. THE MANUFACTURER'S PART OR TYPE NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND SHIPPING CONTAINERS SHALL CONTAIN THE NASA DRAWING NUMBER, THE DASH NUMBER AND THE REVISION LETTER, OR LOT CODE NUMBER
     - (2) LEAD MATERIAL SHALL BE NICKEL PER ND 1015400. A CERTIFICATION OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
   - C. DIMENSIONS PER FIGURE.

3. DESIGN REQUIREMENTS:
   - A. PER MIL-R-10509 AS MODIFIED BY THIS DRAWING.
   - B. POWER RATING: 0.10 WATT AT +125°C DERATED LINEARLY TO 175°C.
   - C. TEMPERATURE COEFFICIENT: ± 25 PPM/°C (-55°C TO +175°C)
   - D. MAX CONTINUOUS WORKING VOLTAGE: 200 VOLTS
   - E. DIELECTRIC WITHSTANDING VOLTAGE: 750 VOLTS RMS

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. EACH UNIT SHALL BE BURNED IN FOR 100 HOURS AT RATED POWER AT 125°C. THE RESISTANCE CHANGE SHALL NOT BE MORE THAN 0.1% FROM INITIAL MEASURED VALUE, OR OUT OF INITIAL TOLERANCE, AFTER BURN-IN THE BURN-IN DATA SHALL BE INCLUDED WITH EACH SHIPMENT. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL RESISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497
DRAWN PATTERSON DATE 4-FEB-64
CHECKED FOSTER 6-FEB-64
APPROVAL B. B. Test 5/26/64
APPROVAL
NASA APPROVAL 5/26/64
MIT APPROVAL W. K. for 26 May 64

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230 SIZE C NASA DRAWING NO. 1010733 -
SCALE NONE WT SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

B 1010733

REVISIONS 08768

SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 08768	5/26/64	WK.
A	REVISED PER TDRR 10368	6/29/64	WK.
B	REVISED PER TDRR 19132	5/26/65	WK

TABLE I

DASH NUMBER	RESISTANCE (OHMS) ± 0.1%
1	97.41
2	97.70
3	196.8
4	399.3
5	409.5
6	8K
7	16K
8	27.06K
9	32K
10	65.33K
11	100K
12	25K
13	50K
14	475Ω
15	54.9K
16	866.9K
17	128.15K
18	866.9

TABLE II

DASH NUMBER	RESISTANCE (OHMS) ±1.0%
101	2K
102	2.6K
103	4K
104	8K
105	10K
106	11K
107	12K
108	13K
109	14K
110	15K
111	16K
112	17K
113	18K
114	19K
115	20K
116	75K
117	100K
118	150K
119	200K

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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DWG. NO. CONTRACT

DRAWN J. Cowley DATE 22 MAY 64
CHECKED A. Marts 5-25-64
APPROVAL D. R. Test 5-26-64
APPROVAL
NASA APPROVAL 5/26/64
MIT APPROVAL 26 May 64

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	1010733
SCALE	WT	SHEET 2 OF 2

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010733 C

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 08768	[illegible]	WK
A	REVISED PER TDRR 10368	[illegible]	WK
B	REVISED PER TDRR 19132	[illegible]	WK
C	REVISED PER TDRR 23461	11-16-65	WK

08768

REQUIREMENTS:

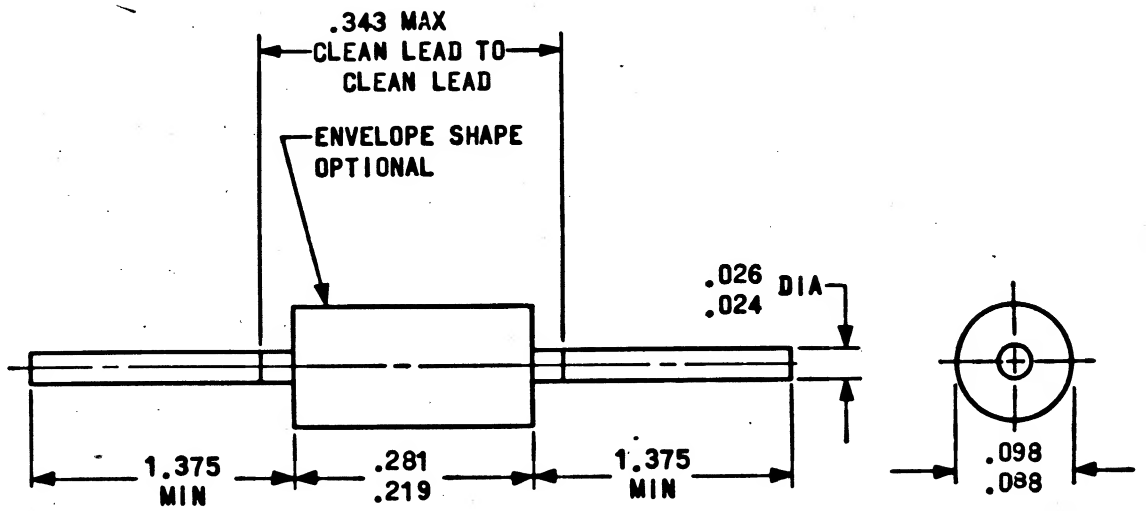
1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. UNITS SHALL MEET THE REQUIREMENTS OF MIL-R-10509 STYLE RN55, CHARACTERISTIC E, TOLERANCE B; EXCEPT AS SPECIFIED HEREIN.
   - C. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404. CLASS 2.
   - D. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002057 UNLESS MODIFIED OR AMENDED BY THE DESIGN REQUIREMENTS SECTION OF THIS DRAWING.
   - E. UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH ND 1002129.

2. INSPECTION AND ACCEPTANCE:
   - A. ELECTRICAL REQUIREMENTS:
     - (1) RESISTANCE VALUES: PER TABLE
     - (2) RESISTANCE TOLERANCE: SEE TABLE
   - B. MECHANICAL REQUIREMENTS:
     - (1) MARKING: THE MANUFACTURER'S NAME OR SYMBOL (CAN BE CHARACTERISTIC COLOR), THE LAST THREE DIGITS OF THE NASA DRAWING NUMBER, DASH NUMBER, REVISION LETTER, AND SERIAL NUMBER, SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER ND1002019. THE MANUFACTURER'S PART OR TYPE NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND SHIPPING CONTAINERS SHALL CONTAIN THE NASA DRAWING NUMBER, THE DASH NUMBER AND THE REVISION LETTER, OR LOT CODE NUMBER
     - (2) LEAD MATERIAL SHALL BE NICKEL PER ND 1015400. A CERTIFICATION OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
   - C. DIMENSIONS PER FIGURE.

3. DESIGN REQUIREMENTS:
   - A. PER MIL-R-10509 AS MODIFIED BY THIS DRAWING.
   - B. POWER RATING: 0.10 WATT AT +125°C DERATED LINEARLY TO 175°C.
   - C. TEMPERATURE COEFFICIENT: ± 25 PPM/°C (-55°C TO +175°C)
   - D. MAX CONTINUOUS WORKING VOLTAGE: 200 VOLTS
   - E. DIELECTRIC WITHSTANDING VOLTAGE: 750 VOLTS RMS

4. SPECIAL CONDITIONING BY SUPPLIER:
   - A. EACH UNIT SHALL BE BURNED IN FOR 100 HOURS AT RATED POWER AT 125°C. THE RESISTANCE CHANGE SHALL NOT BE MORE THAN 0.1% FROM INITIAL MEASURED VALUE, OR OUT OF INITIAL TOLERANCE, AFTER BURN-IN THE BURN-IN DATA SHALL BE INCLUDED WITH EACH SHIPMENT. THE DATA SHALL BE PRESENTED IN A MANNER THAT PROVIDES POSITIVE IDENTIFICATION OF EACH INDIVIDUAL RESISTOR WITH THE INITIAL TEST READING, THE FINAL READING AND THE PERCENT CHANGE BETWEEN THE FINAL AND INITIAL READING. THE TEST DATA SUBMITTED SHALL ALSO IDENTIFY PARTS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

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CAMBRIDGE, MASS.
DWG. NO. Contract NAS 9-497

DRAWN PATTERSON DATE 4-FEB-64
CHECKED FOSTER 6-FEB-64
APPROVAL [illegible] 5/26/64
APPROVAL
NASA APPROVAL [illegible] 5/26/64
MIT APPROVAL [illegible] 26 May 64

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1010733
SCALE NONE
WT
SHEET 1 OF 3

1010733 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

— 1010733 —

REVISIONS 08768			
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 08768	5/26/64	WK.

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
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   - A. ELECTRICAL REQUIREMENTS:
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     - (2) RESISTANCE TOLERANCE: SEE TABLE
   - B. MECHANICAL REQUIREMENTS:
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     - (2) LEAD MATERIAL SHALL BE NICKEL PER ND 1015400. A CERTIFICATION OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
   - C. DIMENSIONS PER FIGURE.

3. DESIGN REQUIREMENTS:
   - A. PER MIL-R-10509 AS MODIFIED BY THIS DRAWING.
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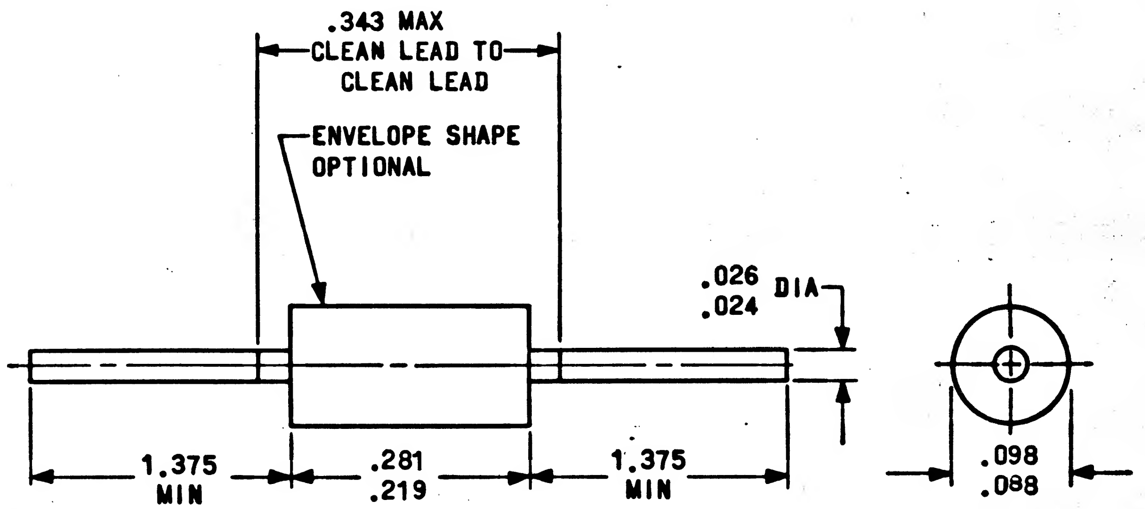

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQUIREMENTS
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
Contract NAS 9-497
DRAWN PATTERSON DATE 4-FEB-64
CHECKED FOSTER 6-FEB-64
APPROVAL D. R. Teat 5/26/64
APPROVAL
NASA APPROVAL 5/26/64
MIT APPROVAL 26 May 64

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HOUSTON, TEXAS

RESISTOR, FIXED, FILM

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1010733
SCALE NONE
WT
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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— 1010733

REVISIONS		08768	
SYM	DESCRIPTION	DATE	APPROVAL
—	INITIAL RELEASE CLASS A PER TDRR 08768	5/26/64	WK

TABLE I

DASH NUMBER	RESISTANCE (OHMS)± 0.1%
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10	65.33K
11	100K
12	25K
13	50K
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TABLE II

DASH NUMBER	RESISTANCE (OHMS)±1.0%
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118	150K

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FINAL FINISH

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DWG. NO. CONTRACT

DRAWN J. Cowley DATE 22 MAY 64
CHECKED A. Marts 5-25-64
APPROVAL D. G. Hoag 5-26-64
APPROVAL
NASA APPROVAL 5/26/64
MIT APPROVAL 26 May 64

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SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	C	1010733
SCALE	WT	SHEET 2 OF 2

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY